OWNER'S OPERATING MANUAL

CRYSTAL SERIES

CX-40HD
CX-46HD

1080p High-Definition LCD Flat Panel Displays
with WideVision™

RUNCO

THE WORLD'S FINEST HOME THEATER PRODUCTS™

ONE YEAR LIMITED WARRANTY

For LCD Displays

Congratulations on your purchase of a Runco video product and welcome to the Runco family! We believe Runco produces "The World's Finest Home Theater Products." With proper installation, setup and care, you should enjoy many years of unparalleled video performance.

This is a LIMITED WARRANTY as defined in the Magnuson-Moss Warranty Act. Please read it carefully and retain it with your other important documents.

WHAT IS COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

SERVICE LABOR: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of a manufacturing defect for a period of one (1) year from the effective date of delivery to the end user.

PARTS: Runco will provide new or rebuilt replacement parts for the parts that fail due to defects in materials or workmanship for a period of one (1) year from the effective date of delivery to the end user. Such replacement parts are then subsequently warranted for the remaining portion (if any) of the original warranty period.

WHAT IS NOT COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

Image retention on LCD display panels is specifically excluded from coverage under this Limited Warranty. Image retention or staining of an image is the result of misuse of the product and therefore cannot be repaired under the terms of this Limited Warranty.

Normal viewing material such as television/satellite broadcasts, videotape or DVDs (not put into pause for extended periods of time) will not cause damage to your display under normal conditions. Many DVD players are also equipped with screen savers for this reason.

TO AVOID IMAGE RETENTION (Burn-in): Please ensure that still images are not left on your LCD display panel. Also ensure that images displayed in the 4:3 aspect ratio mode (black or gray stripes, but no picture information is present on the left and right edges of the screen) are used as infrequently as possible. This will prevent permanent retention on your LCD display panel, which can be seen permanently under certain conditions once burn-in has occurred.

The types of images to avoid include video games, still images and computer screens with stationary tool bars and icons. (This is why computers are equipped with screen savers – to prevent still images from burning into the monitor's phosphors after being displayed continuously for an extended period of time).

This Limited Warranty only covers failure due to defects in materials and workmanship that occur during normal use and does not cover normal maintenance. This Limited Warranty does not cover cabinets or any appearance items; failure resulting from accident, misuse, abuse, neglect, mishandling, misapplication, faulty or improper installation or setup adjustments; improper maintenance, alteration, improper use of any input signal; damage due to lightning or power line surges, spikes and brownouts; damage that occurs during shipping or transit; or damage that is attributed to acts of God. In the case of remote control units, damage resulting from leaking, old, damaged or improper batteries is also excluded from coverage under this Limited Warranty.

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Runco limits its obligations under any implied warranties under state laws to a period not to exceed the warranty period. There are no express warranties. Runco also excludes any obligation on its part for incidental or consequential damages related to the failure of this product to function properly. Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages. So the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

EFFECTIVE WARRANTY DATE:

This warranty begins on the effective date of delivery to the end user. For your convenience, keep the original bill of sale as evidence of the purchase date.

IMPORTANT – WARRANTY REGISTRATION:

Please fill out and mail your warranty registration card. It is imperative that Runco knows how to reach you promptly if we should discover a safety problem or product update for which you must be notified.

CONTACT A RUNCO AUTHORIZED SERVICE CENTER TO OBTAIN SERVICE:

Repairs made under the terms of this Limited Warranty covering your Runco video product will be performed at the location of the product, during usual working hours, providing location of product is within normal operating distance from a Runco Authorized Service Center. In some instances it may be necessary for the product to be returned to the Runco factory for repairs. If, solely in Runco's judgment, location of product to be repaired is beyond normal operating distance of the closest Runco Authorized Service Center, or the repair requires the unit be returned to the Runco factory, it is the owner's responsibility to arrange for shipment of the product for repair. These arrangements must be made through the selling Runco Dealer. If this is not possible, contact Runco directly for a Return Authorization number and shipping instructions. Runco will return product transportation prepaid in the United States, unless no product defect is discovered. In that instance, shipping costs will be the responsibility of the owner.

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Runco International products are manufactured under one or more of the following patents: US. Patent 6755540 and Other Patents Pending.

ADDITIONAL INFORMATION:

To locate the name and address of the nearest Runco Authorized Service Center, or for additional information about this Limited Warranty, please call or write:

RUNCO INTERNATIONAL, INC.
Attn: Customer Service Department
2900 Faber Street
Union City, CA 94587
Ph: (510) 324-7777
Fax: (510) 324-9300
Toll Free: (800) 23-RUNCO

RUNCO VIDEO-PRODUCT INFORMATION
RETAIN THIS INFORMATION FOR YOUR RECORDS

_____ _____

Model Purchased Date

_____

Serial Number

_____

Runco Authorized Dealer Name

_____

Address

_____ _____ _____

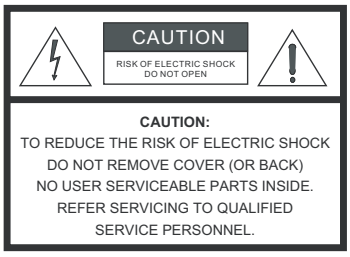
City State/Province Postal Code

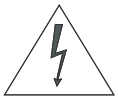
_____ _____

Phone Fax

Safety Precautions

Thank you for your purchase of this quality Runco product! It has been designed to provide you with the quality of video that is expected in a home theater. For the best performance, please read this manual carefully as it is your guide through the menus and operation.





WARNING
This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CAUTION

To turn off main power, be sure to remove the plugs from power outlets. The power outlet socket should be installed as near to the equipment as possible, and should be easily accessible.

WARNING

TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE. ALSO DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS, UNLESS THE PRONGS CAN BE FULLY INSERTED. REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH-VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

This equipment has been tested and found to comply with the limits for a Class "B" digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Installation Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be required to correct the interference at his own expense.

DOC Compliance Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Please read and follow the safety precautions listed below to ensure the equipment is free from damage, and to ensure that no injury will occur as a result of improper use.

- Do not insert any object, especially metal or liquids, into the LCD display.
- Do not place any objects containing water or any other liquid on top of the LCD display.
- Do not place the units in direct sunlight, near heaters or in extremely dusty or humid locations.
- Do not install this system outdoors or otherwise exposed to the elements.
- Do not place heavy objects on top of the LCD display.
- If the power cord is damaged or frayed in any way, electrical shock and/or fire may result. Do not place objects on the power cord, and keep the cord away from heat-emitting devices. Should the power cord become damaged in any way, please contact your Runco Dealer for a replacement cord.
- Do not remove the cover of the LCD display for any reason. If any problems arise with the unit, please contact a Runco Dealer or Runco International for service. Removing the covers will void the warranty.

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Notes:

1. Introduction

1.1 About This Manual

This Owner's Manual describes how to install, set up and operate the Runco Crystal Series Model CX-40HD and CX-46HD Flat-Panel LCDs. Throughout this manual, the Runco CX-40HD and CX-46HD Flat-Panel LCDs are referred to simply as the "Crystal Series LCD."

◄ ***Target Audience***

Runco has prepared this manual to help home theater installers and end users get the most out of the Crystal Series LCD.

Runco has made every effort to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time. You can always find the latest version of this and other Runco product manuals on-line, at www.runco.com.

◄ ***If You Have Comments About This Manual...***

Runco welcomes your comments about this manual. Send them to techpub@runco.com.

◄ ***Textual and Graphic Conventions***

Text Conventions: The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote control button identifiers are set in upper-case bold type; for example, "Press **EXIT** to return to the previous menu."
- Computer input (commands you type) and output (responses that appear on-screen) is shown in monospace (fixed-width) type; for example: "To change the aspect ratio to Letterbox, type `[S4E0002`."
- All keys with functional names are initial-capped, set in bold type and enclosed in angle brackets. These keys are the following: **<Enter>**, **<Spacebar>**, **<Control>**, **<Esc>** and **<Tab>**.
- **<Enter>** indicates that you may press either the RETURN or ENTER key on your computer keyboard if it has both keys.

In addition to these conventions, underlining, boldface and/or italics are occasionally used to highlight important information, as in this example:

Note

*A carriage return **must** be used after each command or string.*

Graphic Conventions: These symbols appear in numerous places throughout the manual, to emphasize points that you must keep in mind to avoid problems with your equipment or injury:

Tip	*TIPS highlight time-saving short cuts and helpful guidelines for using certain features.*
Note	*NOTES emphasize text with unusual importance or special significance. They also provide supplemental information.*
Caution	*CAUTIONS alert users that a given action or omitted action can degrade performance or cause a malfunction.*
WARNING	*WARNINGS appear when a given action or omitted action can result in damage to the equipment, or possible non-fatal injury to the user.*
DANGER!	*DANGER appears when a given action can cause severe injury or death.*

1.2 Using This Manual

Use the following table to locate the specific information you need in this manual.

If you need...	... Turn to page:
Information about obtaining service	iv
General information about the CX-40HD and CX-46HD Flat-Panel LCDs	3
Installation instructions	13
First-time configuration instructions	25
Advanced configuration instructions	42
Troubleshooting tips	51
Specifications for the CX-40HD and CX-46HD Flat-Panel LCDs	59

1.3 Description, Features and Benefits

Runco presents the Crystal Series CX-40HD and CX-46HD Flat-Panel LCDs, perfect for those who demand our award-winning flat panel performance in a more intimate size than we offer with our larger plasma monitors. The Crystal Series LCDs are ideal for close-in viewing where picture quality remains a high priority, but larger displays cannot be accommodated.

The Crystal Series LCDs incorporate the superb Vivix™ digital video processing that produces outstanding picture quality with a wide range of both standard and high definition source material. In addition, the handsome, gloss black-finish television is engineered with ISF™ calibration standards for the purest video performance.

The CX-40HD and CX-46HD Flat-Panel LCDs also feature a built-in ATSC tuner that receives terrestrial DTV broadcasts, in addition to an advanced, 185 channel, cable-ready NTSC stereo tuner. The Crystal Series LCD offers PIP, PBP, closed captioning, Parental Control (V-Chip) functionality and multi-language support. The display includes an integrated stereo audio system incorporating surround sound technology with two-way speakers and generous power amplification.

The advanced TFT active-matrix LCD display panel offers 1920 x 1080 resolution and includes Runco's discrete aspect ratio control with VirtualWide™ mode to fill the 16:9 screen with standard 4:3 images without loss of picture quality. Also included are discrete source, aspect ratio and power selection and an RS-232 interface for whole-house or automated control system integration.

The Crystal Series LCD is multimedia ready, with simple computer connections making gaming, Internet browsing and other computer activities quick and easy.

◄ *Key Features and Benefits*

The Crystal Series LCD offers these key features and benefits:

- Native Resolution: 1920 x 1080 (16:9 Native Aspect Ratio)
- Multiple Aspect Ratios with VirtualWide™ Mode
- Less than 4 inches thin
- Two HDMI Inputs with High-bandwidth Digital Content Protection (HDCP)
- Built-in HDTV Tuner
- Exceptional detail and artifact-free video enhancement
- Runco video processing with 3:2 film detection circuitry

Parts List ➤ Your Crystal Series LCD is shipped with the following items. If any items are missing or damaged, please contact your Runco dealer or Runco Customer Service at (800) 23-RUNCO.

- CX-40HD or CX-46HD LCD Display (with Table Stand)
- Remote Control Unit and two (2), AAA-size batteries
- AC Power Cord
- Warranty information and registration card
- Runco CX-40HD/CX-46HD Owner's Operating Manual (this document)

Optional Accessories:

- Wall Mount kit (Runco part number RUHK-004750)

Controls and Functions

2.1 Crystal Series LCD at a Glance

Figure 2-1 shows the locations of the Crystal Series LCD controls and indicators.

◄ ***Controls and Indicators***

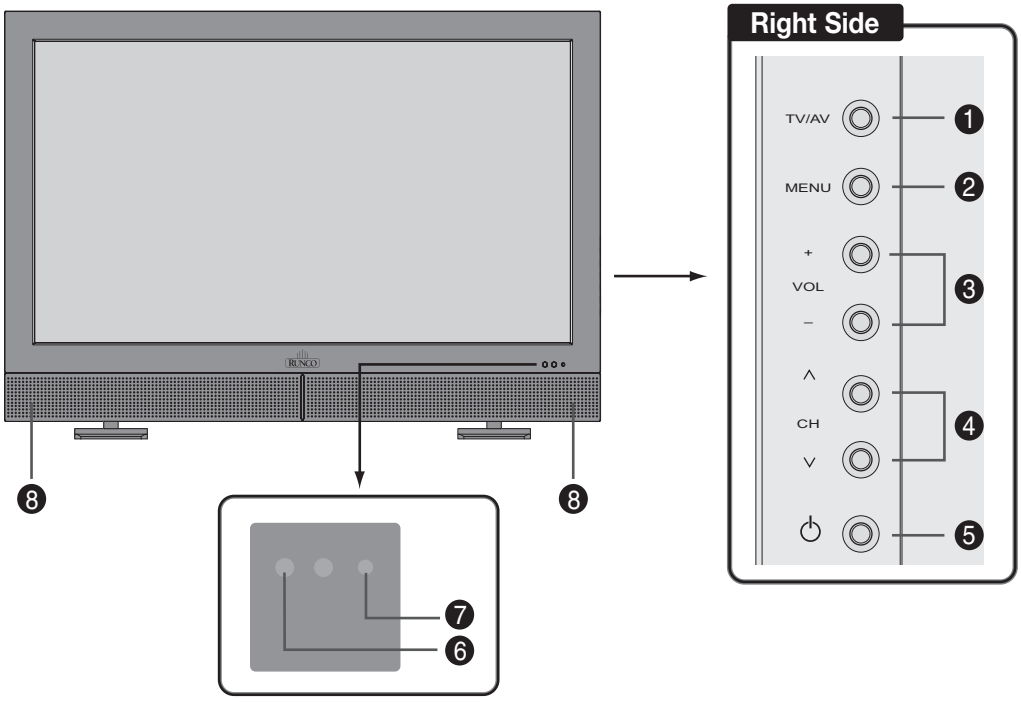


Figure 2-1. Crystal Series LCD Controls and Indicators

1. **TV/AV Button (Input Source Selection)**
2. **MENU Selection Button**
3. **Volume Adjustment Buttons**
4. **Channel Selection Buttons**
5. **Power Button**
6. **Remote Control Sensor**
7. **Power Indicator**
   Lights red to indicate that the Crystal Series LCD is in standby mode; lights green to indicate normal operation; flashes green when the Crystal Series LCD receives a signal from the remote control.
8. **Speakers**

Crystal Series LCD Inputs and Outputs ➤

Figure 2-2 shows the locations of the Crystal Series LCD inputs and outputs.

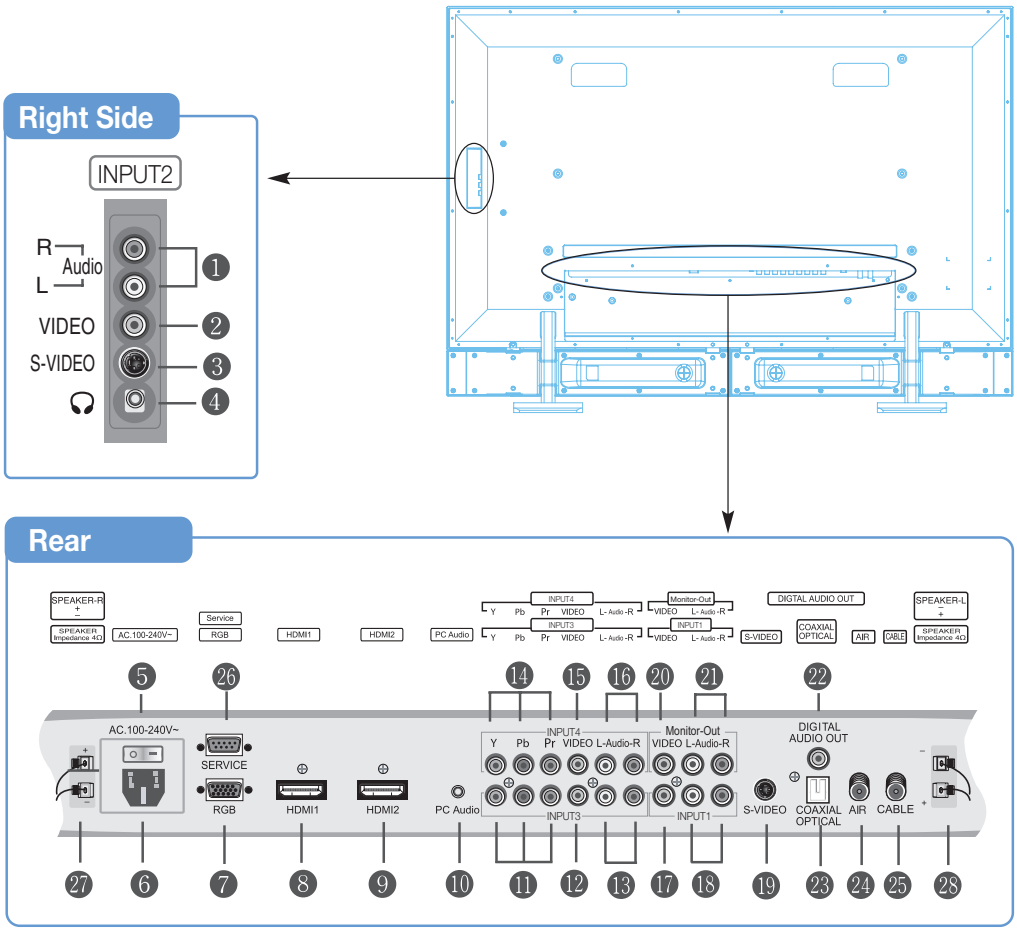


Figure 2-2. Crystal Series LCD Rear-Panel Inputs and Outputs

1. **INPUT2 Audio Input**
2. **INPUT2 Composite Video Input**
   Standard composite video input for connecting a VCR, camcorder, laser disc player or other composite video source.
3. **INPUT2 S-Video Input**
   Standard S-Video input for connecting a DVD player, satellite receiver or Super VHS (S-VHS) VCR.
4. **Headphone Jack**
5. **Main Power Switch**
6. **Power Input (100 to 240 VAC)**
   Connect the Crystal Series LCD to power here.
7. **RGB**
   A 15-pin VGA connection to a personal computer. The Crystal Series LCD automatically detects the signal resolution.
8. **HDMI1/Computer Input (Digital)**

9. **HDMI2/Computer Input (Digital)**

   Two, HDCP-compliant digital video inputs for connecting a DVD player, personal computer or HD tuner with a DVI or HDMI output.

   Tip

   For best results, do not run your DVD player in progressive mode.

10. **PC Audio Input**
    Connect the audio output from a personal computer here.
11. **INPUT3 Component Video (RCA connectors)**
    Standard-definition (480i/576i) or high-definition (720p/1080i), YPrPb component input. This is the input for component video from sources such as DVD players.
12. **INPUT3 Composite Video Input**
13. **INPUT3 Audio Input**
    Connect the audio output from your Input 3 source here.
14. **INPUT4 Component Video (RCA connectors)**
    Standard-definition (480i/576i) or high-definition (720p/1080i), YPrPb component input. This is the input for component video from sources such as DVD players.
15. **INPUT4 Composite Video Input**
16. **INPUT4 Audio Input**
    Connect the audio output from your Input 4 source here.
17. **INPUT1 Composite Video Input**
18. **INPUT1 Audio Input**
    Connect the audio output from your Input 1 source here.
19. **INPUT1 S-Video Input**
20. **AV-OUT (Composite Video)**
21. **AV-OUT (Audio)**
22. **DIGITAL AUDIO OUT (S/PDIF – Coaxial)**
23. **DIGITAL AUDIO OUT (TosLink – Optical)**

    Connect either #22 or #23 to the digital audio input of an A/V amplifier with a Dolby Digital® decoder.

24. **AIR (Antenna) Input**
    75-ohm coaxial input for connecting a TV antenna to the digital TV input.
25. **CABLE Input**
    75-ohm coaxial input for connecting a CATV system to the digital TV input.
26. **RS-232 CONTROL PORT**
    A female, 9-pin D-sub connector for interfacing with a PC or home theater automation/control system.
27. **SPEAKER OUTPUT (RIGHT)**
28. **SPEAKER OUTPUT (LEFT)**

    For connection of the right (27) left (28) speakers. Connect a speaker with an impedance of 4 ohms.

2.2 Crystal Series LCD Remote Control

Figure 2-3 shows the Crystal Series LCD remote control, and the paragraphs that follow describe its functionality.

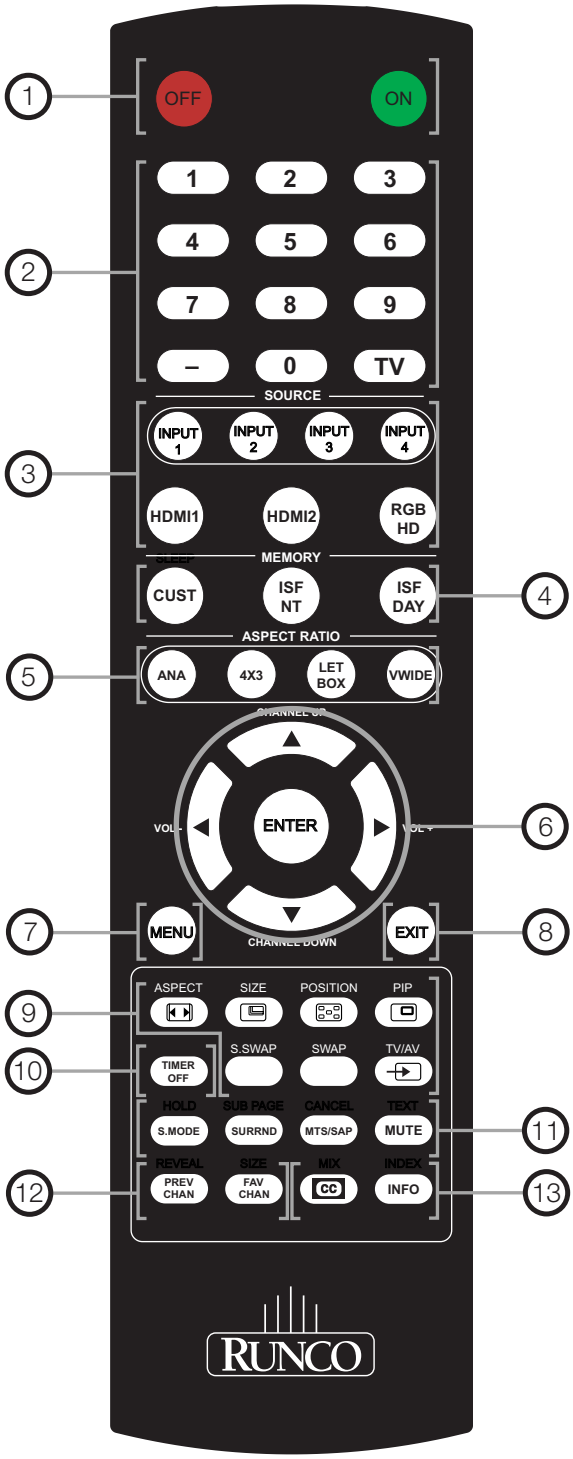


Figure 2-3. Crystal Series LCD Remote Control

1. **OFF / ON**
   Use these buttons to turn the Crystal Series LCD on or off.
2. **Numeric Buttons**
   Use these buttons to enter TV channel numbers or menu pass codes. Use the **TV** button to switch to the Antenna/DTV/CATV input. Use the **-** button to enter DTV sub-channel numbers.
3. **Source Selection Buttons**

   INPUT 1
   Press this button to switch to Input 1.

   INPUT 2
   Press this button to switch to Input 2.

   INPUT 3
   Press this button to switch to Input 3.

   INPUT 4
   Press this button to switch to Input 4.

   Note

   Input 1 and Input 2 have both S-Video and composite video connectors. Input 3 and Input 4 have both component and composite video connectors.

   To specify which connection type you are using – or to switch from one to the other if equipment is connected to both – use the Input Selection menu under Setup (refer to ***Input Selection*** *on page 40).*

   HDMI 1 / HDMI 2
   Use these buttons to select a Digital Video input (HDMI 1 or HDMI 2).

   RGB HD
   Press this button to switch to the RGB HD input.
4. **Memory Preset Buttons**

   CUST
   Press to recall settings for the current input from the “Custom” memory preset.

   ISF NT (Night)
   Press to recall settings for the current input from the “ISF Night” memory preset.

   ISF DAY
   Press to recall settings for the current input from the “ISF Day” memory preset.

5. **Aspect Ratio Selection Buttons**

   ANA (16:9 Anamorphic)
   For 16:9 DVDs or HDTV program material.

   4X3 (Standard 4:3)
   The input signal is scaled to fit 4:3 display mode in the center of the screen.

   LETBOX (Letterbox)
   Image in letterbox format is enlarged to fit 16:9, full-screen display and the upper/lower portions are "blanked off."

   VWIDE (VirtualWide)
   4:3 image is enlarged NON-linearly in horizontal direction to fit 16:9 full screen display.

6. **Arrow Buttons (▲, ◀, ▼, ▶)**
   Use these buttons to select items or settings, adjust settings, change TV channels or adjust sound volume.

   ENTER
   Press to select a highlighted menu item or confirm a changed setting.

7. **MENU**
   Press this button to access the on-screen display (OSD) controls, or to exit the current menu and return to the previous one.

8. **EXIT**
   Press this button to hide the OSD controls.

9. **Picture-In-Picture (PIP) Function Buttons**

   ASPECT
   Press to change the aspect ratio of the PIP window from 4:3 to 16:9 or vice versa.

   SIZE
   Press to choose from three PIP window sizes.

   POSITION
   Press to choose the PIP window position (top left, top right, bottom left or bottom right corner).

   PIP
   Press to change the PIP mode (picture-in-picture, picture-by-picture or off).

   P.MODE
   Press to recall settings for the PIP input from either the "ISF Night" or "ISF Day" memory preset.

   S.SWAP
   Press to switch between the main and PIP audio programs.

   SWAP
   Press to swap the main and PIP windows.

   TV/AV
   Press to switch to a different PIP video source.

10. **TIMER OFF Button**
    Press this button to set the sleep timer. Press it repeatedly to scroll through the available options (Off, 10, 30, 60, 120 or 180 minutes).

11. **Sound Control Buttons**

    S.MODE
    Press this button repeatedly to scroll through the available Equalizer presets (CUSTOM, STANDARD, MUSIC, FILM or SPEECH).

    SURRND (Surround)
    Press this button to turn Surround Mode on or off.

    MTS/SAP (Multichannel Television Sound/Second Audio Program)
    Press this button repeatedly to scroll through the available MTS settings (MONO, STEREO, SAP or Mono+SAP).

    MUTE
    Press this button to mute the audio output to the speakers and headphones.

12. **Channel Selection Short-Cuts**

    PREV CHAN
    Press this button to return to the previously-selected channel.

    FAV CHAN
    Press this button repeatedly to select a stored, “favorite” channel. You can store up to five favorite channels. To store favorite channels, select Favorite Channel from the Channel menu (described in Section 4).

13. **Miscellaneous Functions**

    CLOSED CAPTIONING CC
    Press this button to turn Closed Captioning on or off.

    INFO
    Press this button to view input signal information (source and resolution) or program information (if available) when viewing DTV channels.

Notes:

3. Installation

3.1 Remote Control

➤ *Battery Installation*

To install batteries in the remote control:

1. Slide the battery cover in the direction of the arrow and remove it.
2. Insert the included batteries. Ensure that the polarities correctly match the ⊕ and ⊖ markings inside the battery compartment.
3. Slide the battery cover back on until it snaps into place.

Note

1. Do not mix an old battery with a new one or different types of batteries.

2. If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.

➤ *Notes on Remote Control Operation*

- Do not drop the remote control or expose it to moisture or high temperature.
- The remote control may malfunction under a fluorescent lamp. If that occurs, move the LCD display away from the fluorescent lamp.
- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the LCD display.

Note

The signal from the remote control can be reflected by walls or other surfaces.

- If the effective range of the remote control decreases, or it stops working, replace the batteries with new ones.
- Ambient conditions may possibly impede the operation of the remote control. If this happens, point the remote control at the LCD display and repeat the operation.

3.2 Quick Setup

Table 3-1 gives a quick overview of the Crystal Series LCD installation process. The sections following this one provide detailed instructions.

Note

Installation should be performed by a qualified custom video installation specialist.

Table 3-1. Installation Overview

Step	Procedure	For Details, refer to page...
1	Mount the Crystal Series LCD on a wall (optional)	15
2	Connect signal sources to the Crystal Series LCD	16
3	Connect external controller to RS-232 port (optional)	23
4	Apply power to the Crystal Series LCD	25
5	Change the OSD language	25
6	If using the Crystal Series LCD with a PC, adjust PC display properties	26
7	Display calibration: adjust the following ***for each input***; save settings when finished: • Brightness • Contrast • Color level • Tint • Position/phase (for RGB sources)	29 through 41

3.3 Installation Considerations

Proper installation of your Crystal Series LCD will ensure the highest possible picture quality. Whether you are installing the Crystal Series LCD temporarily or permanently, you should take the following into account to ensure that it performs optimally.

◄ *Wall-Mounting the Crystal Series LCD*

You can either place the Crystal Series LCD on a table or in an entertainment center, or mount it on a wall.

If you do decide to wall-mount the Crystal Series LCD, ensure that the wall-mount bracket is installed according to the instructions included with it. The wall must be capable of supporting a redundant weight factor three (3) times the weight of the display, or be reinforced.

Runco recommends that this be done by a custom installation specialist.

Note

Use only the Runco-approved wall-mount kit designed for your display.

◄ *Ambient Light*

In general, minimize or eliminate light sources directed at the display. Contrast ratio in your images will be noticeably reduced if light directly strikes the display, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

◄ *Other Considerations*

Other considerations and tips that can help improve your installation:

- Keep the ambient temperature constant and below 35°C (95°F). Keep the display away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the display circuitry, which may affect performance.
- Keep the Crystal Series LCD away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers and elevators.

3.4 Connections to the Crystal Series LCD

Proceed as follows to connect the Crystal Series LCD to your video sources, external controller(s) – if present – and AC power.

When connecting your equipment:

- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.
- Use the left audio input when connecting mono audio sources.

Connecting the Crystal Series LCD to Source Components ➤

Connect your video sources to the Crystal Series LCD as shown and described in the sections that follow.

Antenna/Cable TV Connection: Connect your antenna or cable television source to the AIR or CABLE jacks on the rear of the Crystal Series LCD; see Figure 3-1.

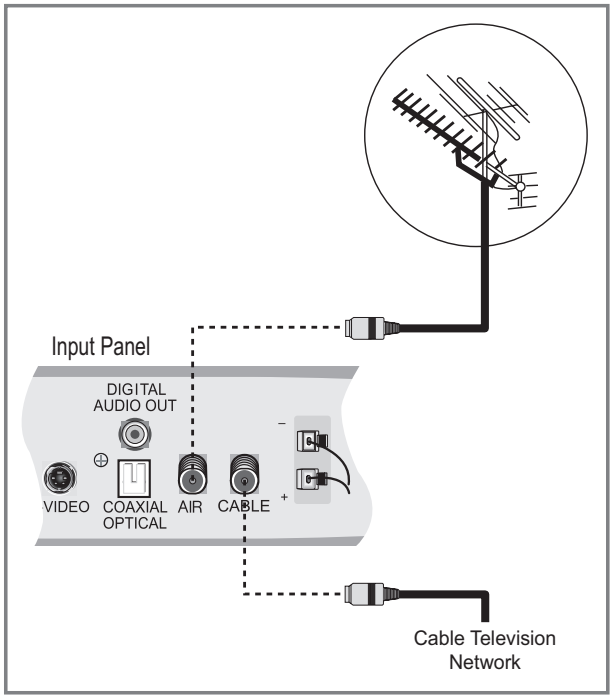


Figure 3-1. Antenna/Cable TV Connection

HDMI Connections: The Crystal Series LCD has two HDMI inputs for connecting a DVD player, DTV decoder, personal computer or any other device with an HDMI or DVI output. Connect such devices as shown in Figure 3-2.

Tip

Use the HDMI inputs whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the display.

Note

This Crystal Series LCD supports the VESA Display Data Channel (DDC) standard. This standard provides "Plug and Play" capability; the display and a VESA DDC-compatible computer communicate their setting requirements, allowing for quick and easy setup.

In order for Plug and Play to work correctly, you must turn on the display before you turn on the connected computer.

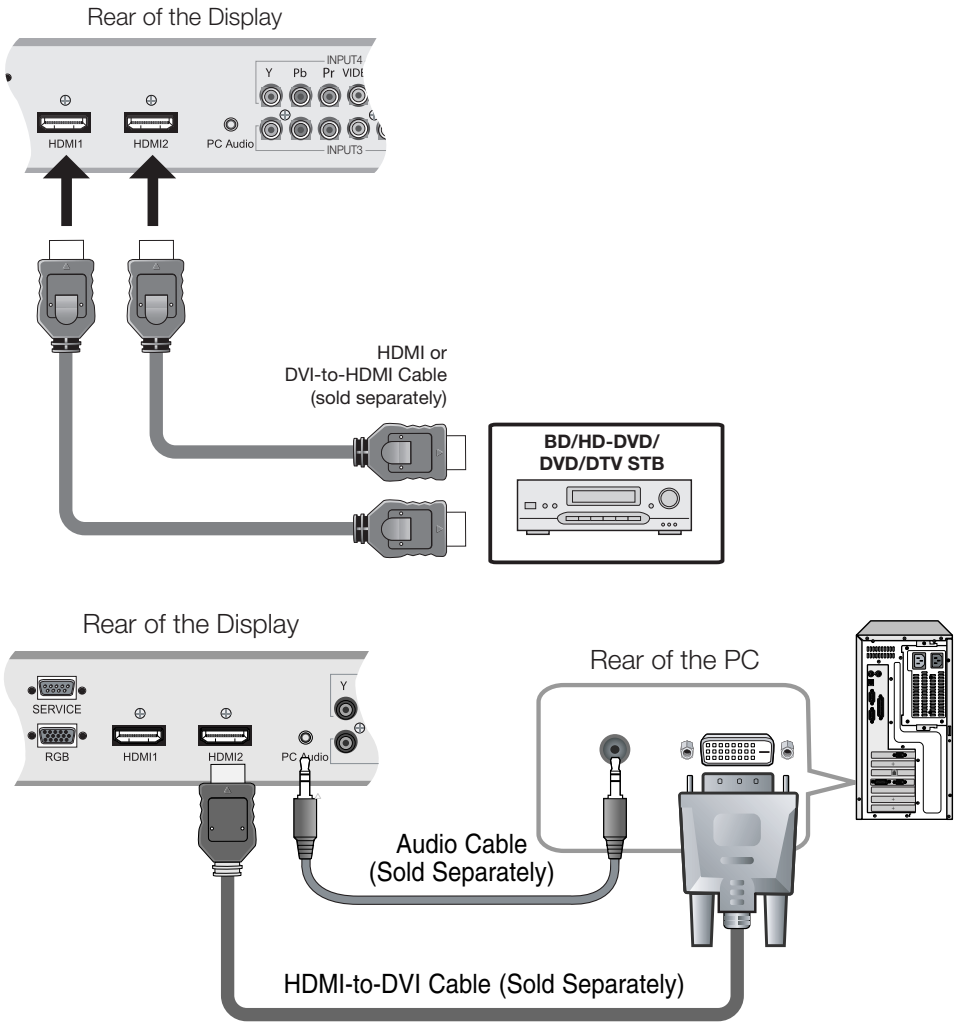


Figure 3-2. HDMI Connections

RGB Connections: The Crystal Series LCD has an RGB input for connecting a personal computer; see Figure 3-3.

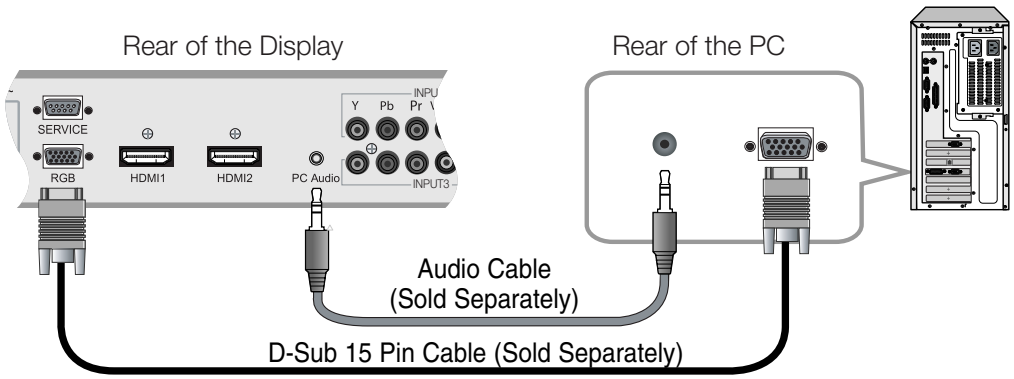


Figure 3-3. Analog RGB Connections

Note

1. *Refer to **Computer Signal Compatibility** on page 63 for a list of computer signals compatible with the Crystal Series LCD. Use with signals other than those listed may cause some functions not to work.*
2. *Some Macintosh computers may require a Macintosh video adapter. Contact your nearest authorized service center or dealer.*
3. *This Crystal Series LCD may not be able to display images from notebook computers in simultaneous (CRT/LCD) mode. Should this occur, switch the notebook computer to "CRT only" mode. If you are unsure how to do this, refer to your notebook computer's user manual.*

Component Video Connections: If you have a DVD player or DTV decoder with a component (YPbPr) output, connect it to INPUT 3 or INPUT 4 of the Crystal Series LCD as shown in Figure 3-4.

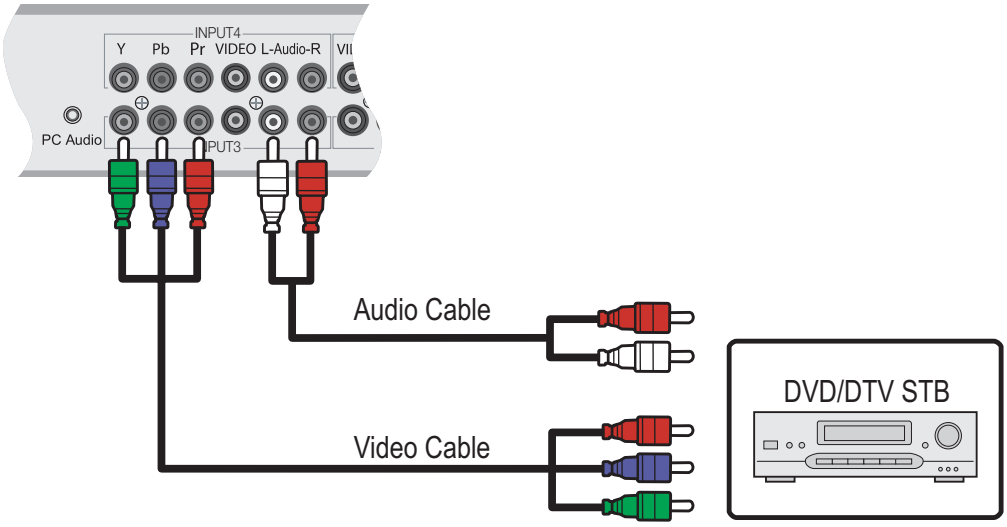


Figure 3-4. Component Video Connections

Composite/S-Video Connections: The Crystal Series LCD has two (2) S-Video and four (4) composite video inputs for connecting a VCR, camcorder, laser disc player or DVD player; see Figure 3-5.

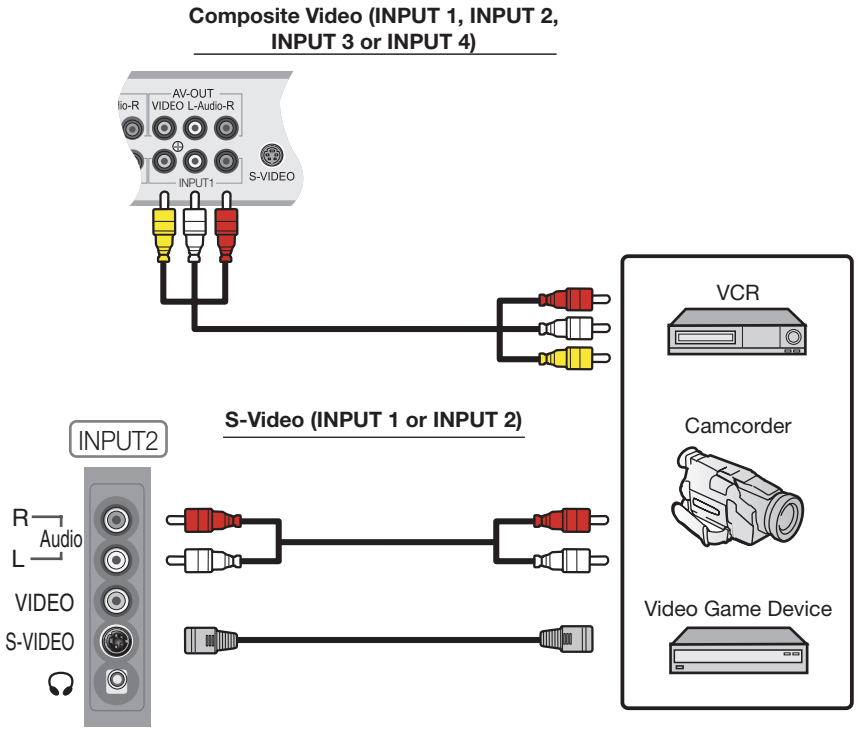


Figure 3-5. Composite and S-Video Connections

AV OUT Connection ➤

The Crystal Series LCD has stereo audio and Composite video outputs for connecting to a second VCR or other auxiliary equipment. Connect the AV OUT audio and video jacks to the audio and video inputs of the VCR or other equipment as shown in Figure 3-6.

You can route either the main or picture-in-picture (PIP) source signal to the AV output. For more information, refer to ***Monitor Out*** on page 40.

Note *The audio output level is fixed. (The volume and mute controls affect only the speaker and headphone outputs.)*

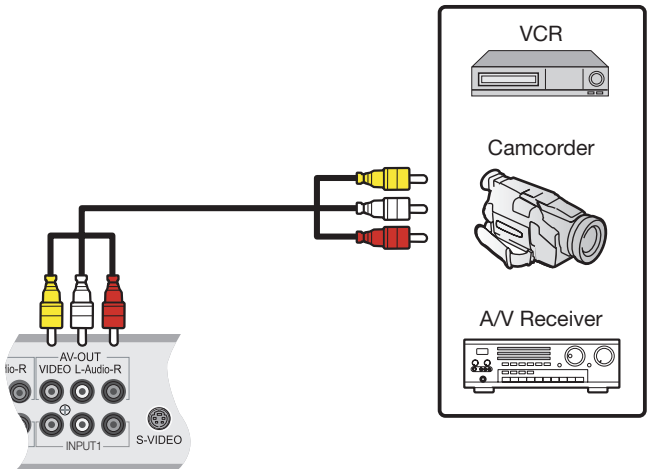


Figure 3-6. AV OUT Connections

Connecting Headphones ➤

You can connect a set of headphones to the Crystal Series LCD to watch a program without disturbing others. Connect them to the headphone output located at INPUT2; see Figure 3-7.

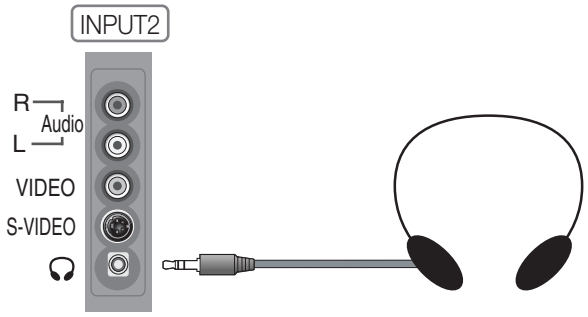


Figure 3-7. Connecting Headphones

➤ *Connecting External Speakers (Optional)*

The Crystal Series LCD is equipped with stereo speakers, which are mounted directly below the screen. If you prefer, you can connect the rear-panel speaker outputs to external speakers.

Connect the ⊕ (positive) and ⊖ (negative) speaker wires to the rear-panel SPEAKER-R and SPEAKER-L terminals; see Figure 3-8. **Maintain the correct polarity.** For more information, refer to the owner's manual for your speakers.

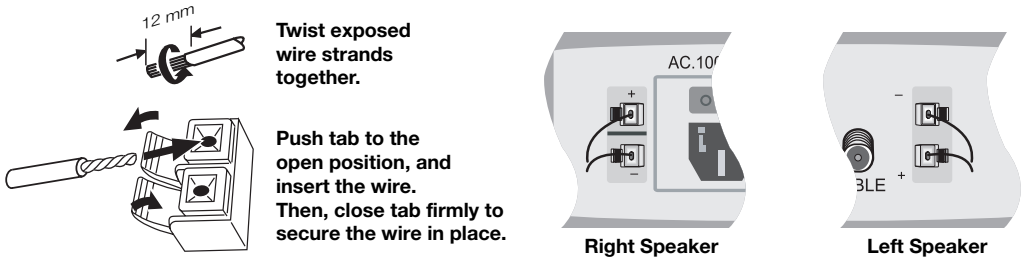

12 mm
Twist exposed wire strands together.
Push tab to the open position, and insert the wire. Then, close tab firmly to secure the wire in place.
Right Speaker
Left Speaker

Figure 3-8. External Speaker Connection

You can also remove the built-in speakers if they are not needed; this permits installation of the display in locations where space above and/or below it is very limited. See Figure 3-9.

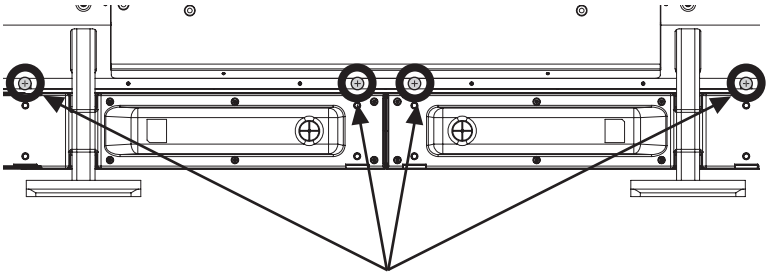


Figure 3-9. Removing the Built-in Speakers

Connecting to a Dolby Digital Amplifier ➤

If your home theater has a Dolby Digital amplifier or receiver, connect the digital audio output from the Crystal Series LCD to the digital audio input of the amplifier/receiver as shown in Figure 3-10. The Crystal Series LCD supports both coaxial (S/PDIF) and optical (TosLink) digital audio connections.

Note *The audio output level is fixed. (The volume and mute controls affect only the speaker and headphone outputs.)*

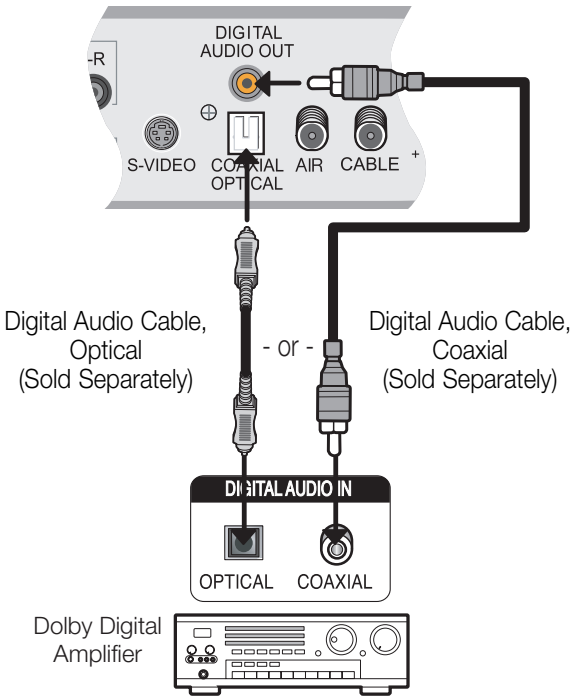


Figure 3-10. Digital Audio Connection

◄ *RS-232 Controller Connection*

Use a straight-through RS-232 cable with a 9-pin male connector to connect a PC or home theater control/automation system (if present) to the RS-232 port on the Crystal Series LCD; see Figure 3-11.

For more information about using this connection, refer to ***Serial Communications*** on page 53.

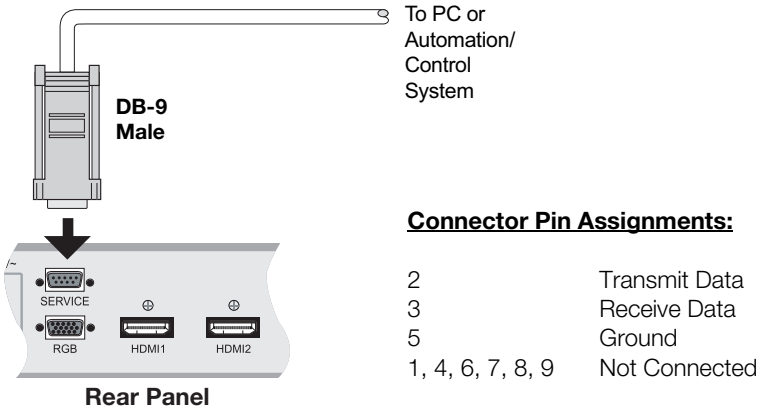


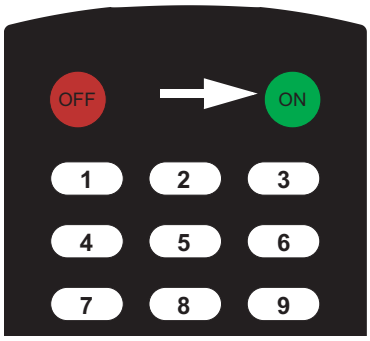
Figure 3-11. RS-232 Control System Connection

Notes:

4. Operation

4.1 Turning on the Power

1. Turn on your source components.
2. Plug the female end of the supplied power cord into the AC receptacle on the rear of the Crystal Series LCD (AC 100V ~ 240V). See Figure 2-2.
3. Connect the other end to your AC power source.
4. Turn on the main power switch at the rear of the display. The power indicator lights red to indicate that the Crystal Series LCD is in “standby” mode.
5. Press the **ON** button on the remote control to turn on the display (or press the power button on the side of the display). The power indicator flashes for a few seconds, then lights solid green.
6. After a brief warm-up period (approximately 10 seconds), the Crystal Series LCD will display an image.



4.2 Changing the OSD Language

The Crystal Series LCD OSD language is initially set to English, but can also display the menus in French, Spanish, Portuguese or German. To change the OSD language:

1. Press **MENU**.
2. Select **Setup** from the Main Menu.
3. Select **OSD Language** from the Setup Menu.
4. Press ▲ or ▼ to highlight the desired language and press **ENTER**. The change takes effect immediately.

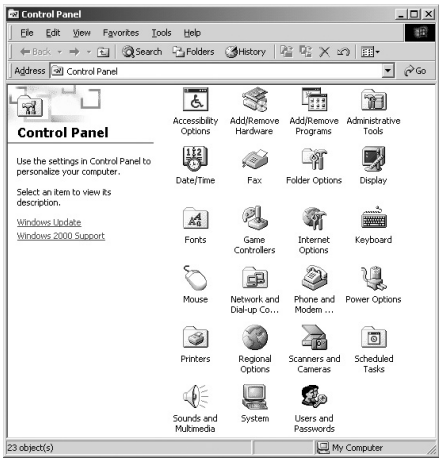
4.3 Setting the PC Display Properties

To maximize image quality when using the Crystal Series LCD with a personal computer, you may need to adjust the display properties of your PC video card. To do this:

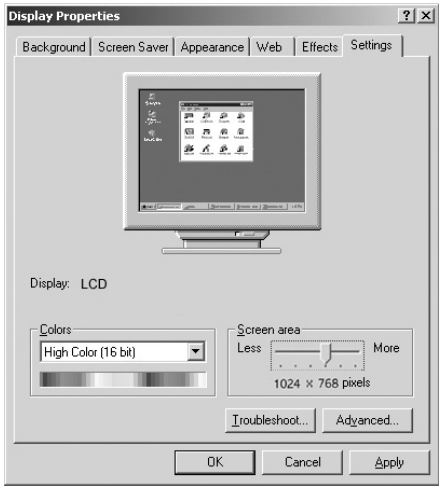
1. Choose **Settings** from the Windows Start menu and click on Control Panel. Then, double-click the **Display** icon;

   – OR –

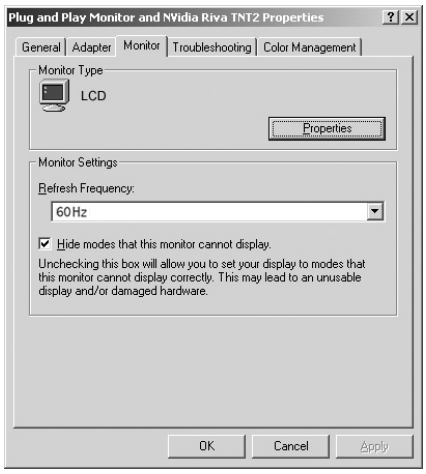
   Right-click anywhere on the Windows Desktop and select **Properties**.



2. Click the **Settings** tab on the display dialog box.
3. Set the Screen area to 1024x768 pixels.



4. Click the **Advanced** button and click the **Monitor** tab on the dialog box.
5. Set the Refresh Frequency to 60Hz and click **OK**.



Note

1. *The maximum available resolution and vertical frequency is 1600x1200/60Hz (RGB), 1280x1024/60Hz (HDMI) or the maximum supported by your video card, whichever is lower. You can get the best picture at 1024x768/60Hz.*
2. *The Crystal Series LCD supports 24-bit color (16,777,216 possible colors).*

4.4 Using the On-Screen Menus

To use the on-screen menus:

1. Press **MENU** to display the Main Menu.
2. To select a menu item, use the up- or down-arrow buttons (▲, ▼) on the remote control to highlight it.
3. Press **ENTER** or the right-arrow button (▶) to access that menu.
4. Use the up- or down-arrow buttons (▲, ▼) to select the setting you want to change. Then, press **ENTER** or the right-arrow button (▶).
5. Press the right- or left-arrow button (◀, ▶) to change that setting.
6. To return to the previous menu, press **MENU** or (◀).

The Crystal Series LCD OSD menus are arranged hierarchically, as shown in Figure 4-1. Depending on the selected input source and/or signal characteristics, some menu options may not be available.

Source	TV	
	Input1	
	Input2	
	Input3	
	Input4	
	RGB	
	HDMI1	
	HDMI2	
Aspect Ratio	16:9	
	4:3	
	Letterbox	
	VirtualWide	
Picture Adjust	Brightness	0, 1, 2, 3 ... 100
	Contrast	
	Color	
	Tint	
	Sharpness	0, 5, 10, ... 100
	DNR	0, 10, 20, ... 100
	MPEG NR	0, 1, 2, 3 ... 63
	Backlight	0, 5, 10, 15, 20, ... 100
	Color Temp.	5400, 6500, 8500 or Custom
	Gamma	2.00, 2.02, 2.04 ... 2.40
	Save Settings	Custom
	Restore Settings	Custom, ISF Day, ISF Night
Audio	Balance	L10, L9, L8 ... 0 ... R8, R9, R10
	Equalizer	Standard, Music, Film, Speech or Custom
	Surround	(On/Off)
	Audio Language	English, Français, Español or Português
	Digital Audio Out	PCM or Dolby Digital
	TV Speaker	(On/Off)
	Audio Delay	0, 1, 2 ... 40 msecs.
Channel	Auto Tuning	STD
		HRC
		IRC
		Return
	Add/Erase	
	Favorite Channel	
Timer	Time	12:00 AM - 11:59 PM or Auto Setup
	On Timer	Enable/Disable, Time, Channel, Volume
	Off Timer	Enable/Disable, Time
	Sleep Timer	Off, 10, 30, 60, 120 or 180 minutes
	Time Zone	Eastern, Central, Mountain, Pacific, Alaska or Hawaii
	Daylight Saving	On / Off or Automatic

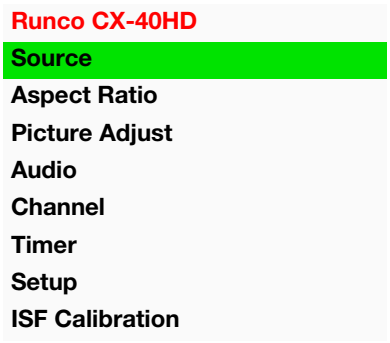
Setup	OSD Language	English, Français, Español, Português or Deutsch	
	PC Mode Adjust	Auto Adjust	
		Clock	
		Phase	
		H. Position	
		V. Position	
	Caption	Display	On / Off
		Digital Mode	Service1, Service2, Service3 ... Service6
		Analog Mode	CC1, CC2, CC3 or CC4 Text1, Text2, Text3 or Text4
		CC On Mute	Yes / No
		Digital Font Option	Control
			Font Size
			Font Style
			FG Color
			BG Color
			Edge Color
			FG Opacity
			BG Opacity
			Edge Style
	Parental Control	Parental Lock (On/Off), TV Rating, Movie Rating, Unrated (Allow/Block), Change PIN (default is 0000)	
	Letterbox Mode	Letterbox or Cinema Fill	
	Input Selection	Input 1/Input 2	Automatic, Video or S-Video
		Input 3/Input 4	Automatic, Video or Component
	Monitor Out	Main or PIP: Video	
	Overscan (not available with PC signals)	H. Overscan, H. Shift, V. Overscan, V. Shift	
	Input Label		
	HDMI Audio	HDMI or PC	
	RGB Signal	Video or PC	
	Film Mode	Off, 2:3, 2:2 or Auto	
	Auto Backlight	Off / On	
	OSD Timer	0, 10, 20 ... 60 sec.	
	Auto Off	0, 30, 60 or 120 min.	
ISF Calibration	Picture Adjust	Brightness	0, 1, 2, 3 ... 100
		Contrast	
		Color	
		Tint	
		Sharpness	0, 5, 10, ... 100
		ADC Phase Adj.	0, 1, 2, 3 ... 63
		DNR	0, 10, 20, ... 100
		MPEG NR	0, 1, 2, 3 ... 63
		Backlight	0, 5, 10, 15, 20, ... 100
		Color Temp.	5400, 6500, 8500 or Custom
		Gamma	2.00, 2.02, 2.04 ... 2.40
		Black Level	0, 1, 2, 3 ... 64
		Save Settings	Custom, ISF Day, ISF Night
	White Balance	R/G/B Gain	
		R/G/B Offset	
	Blue Enable	(Enable/Disable)	
	Baud Rate	115200, 19200, 9600 or 2400	
	Serial Link	On / Off	
	Factory Reset		
	Splash Duration	0, 1, 2, 3, ... 60 secs.	

Figure 4-1. Crystal Series LCD OSD Menu Structure

The Main Menu is the starting point for accessing all Crystal Series LCD functions.

(The ISF Calibration menu is not accessible until you enter a passcode.)

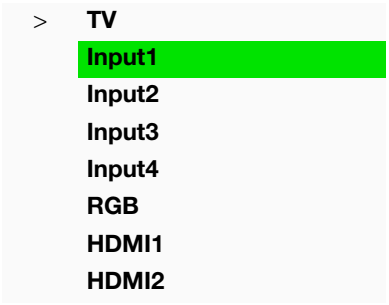
◄ *Main Menu*



From the Main Menu, select Source to choose a video signal source.

The active source is indicated by an arrow (>) to its left; in the example at right, TV is the active source.

◄ *Source*



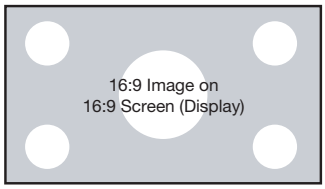
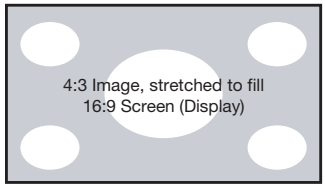
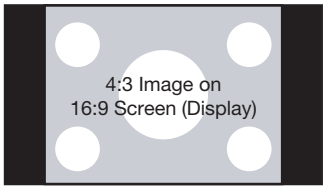
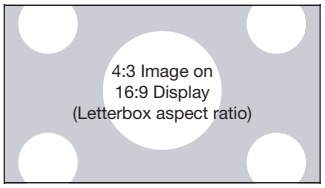
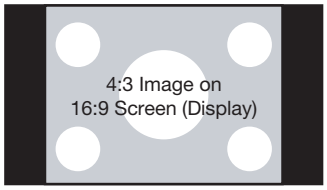
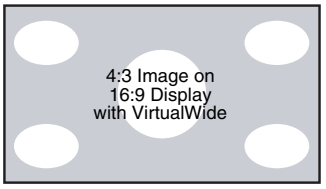
To change the aspect ratio (size and shape) of the projected image, select Aspect Ratio from the Main Menu and press **ENTER**. Select the appropriate aspect ratio for the type of program material being viewed; refer to Table 4-1.

The currently-selected aspect ratio is indicated by an arrow (>) to its left; in the example at right, Anamorphic is selected.

◄ *Aspect Ratio*

Note *The aspect ratio selection persists until you change it. (It is not saved independently for each input.)*

Table 4-1. Aspect Ratio Settings

Aspect Ratio	Remote Control Key	Description	
16:9	ANA	 	Select 16:9 to view 16:9 DVDs and HDTV programs in their native aspect ratio. 4:3 images are stretched horizontally to fit a 16:9 display.
4:3	4X3		4:3 scales the input signal to fit in the center of a 16:9 display. 4:3 is the aspect ratio used by computer monitors, standard television programming and most VHS video cassettes.
Letterbox	LET BOX		Letterbox mode scales (zooms in on) a 4:3 image linearly (by the same amount on all sides) to fill a 16:9 display. Letterbox is best suited for viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.
VirtualWide	VWIDE	 	VirtualWide scales a 4:3 image NON-linearly (more on the sides than in the center) to fit a 16:9 screen.

Use the controls in the Picture Adjust menu to calibrate your Crystal Series LCD for optimum picture quality.

The Crystal Series LCD has been designed to incorporate setup and calibration standards established by the Imaging Science Foundation (ISF). The ISF has developed carefully crafted, industry-recognized standards for optimal video performance and has implemented a training program for technicians and installers to use these standards to obtain optimal picture quality from Runco video display devices. Accordingly, Runco recommends that setup and calibration be performed by an ISF-certified installation technician.

All signal types require separate processing. Therefore, you need to calibrate each input separately.

Note

When you change a picture quality setting, save the change to a preset afterwards. Otherwise, the change will be lost when a different input is selected. (Picture quality settings are saved for each input and resolution separately.) For information about saving settings, refer to ***Save Settings*** *on page 35.*

Although it may be possible to obtain satisfactory picture quality using the naked eye and regular program material, Runco recommends using the following calibration tools for best results:

- External test pattern source – Ovation Multimedia, Digital Video Essentials or AVIA test DVD or equivalent.
- A blue filter (provided with many test DVDs), for color level and tint adjustments.

Connect your test pattern source to the input that you are calibrating and proceed as follows. **Perform the adjustments in the order listed here.**

Brightness: On your external test pattern source, select a PLUGE pattern. (PLUGE is an acronym for “Picture Line-Up Generation Equipment.”) Figure 4-2 shows a typical PLUGE pattern.

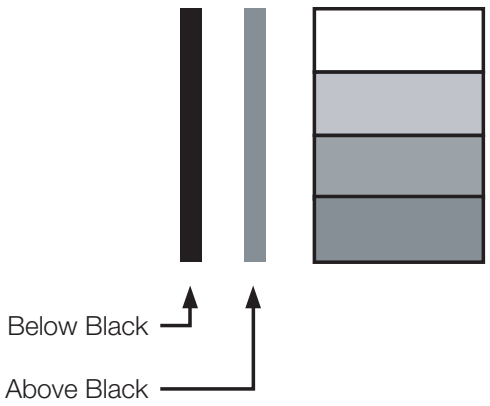


Figure 4-2. Typical PLUGE Pattern for Adjusting Brightness

◄ ***Picture Adjust***

Picture Adjust
Brightness
Contrast
Color
Tint
Sharpness
DNR
MPEG NR
Backlight
Color Temp.
Gamma
Save Settings
Restore Settings

PLUGE patterns vary but generally consist of some combination of black, white and gray areas against a black background. The example above includes two vertical bars and four shaded boxes.

Select Brightness from the Picture Adjust menu. Using the left- and right-arrow (◀ ▶) buttons, adjust the brightness so that:

- The darkest black bars disappear into the background.
- The dark gray areas are barely visible.
- The lighter gray areas are clearly visible.
- The white areas are a comfortable level of true white.
- The image contains only black, gray and white (no color).

Contrast: On your external test pattern source, select a stepped, gray-bar pattern like the one shown in Figure 4-3.

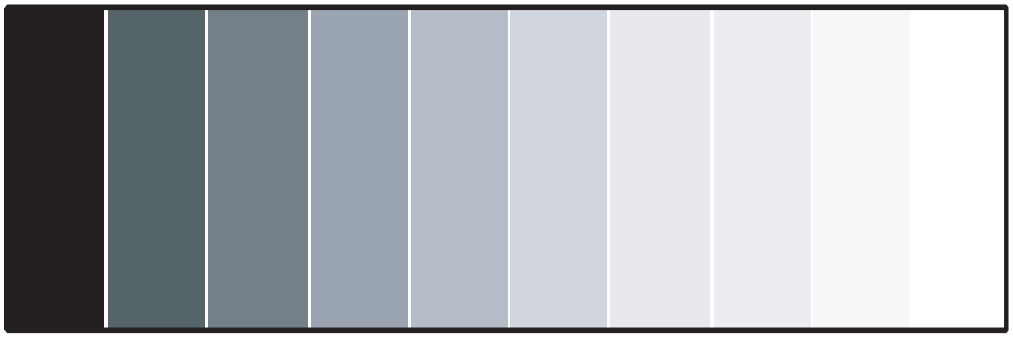


Figure 4-3. Typical Gray Bar Pattern for Adjusting Contrast

Select Contrast from the Picture Adjust menu. Using the left- and right-arrow (◀ ▶) buttons, adjust the contrast to a point just below which the white rectangle starts to increase in size.

Note

Brightness and contrast controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Color Saturation: On your external test pattern source, select a color bar pattern like the one shown in Figure 4-4.

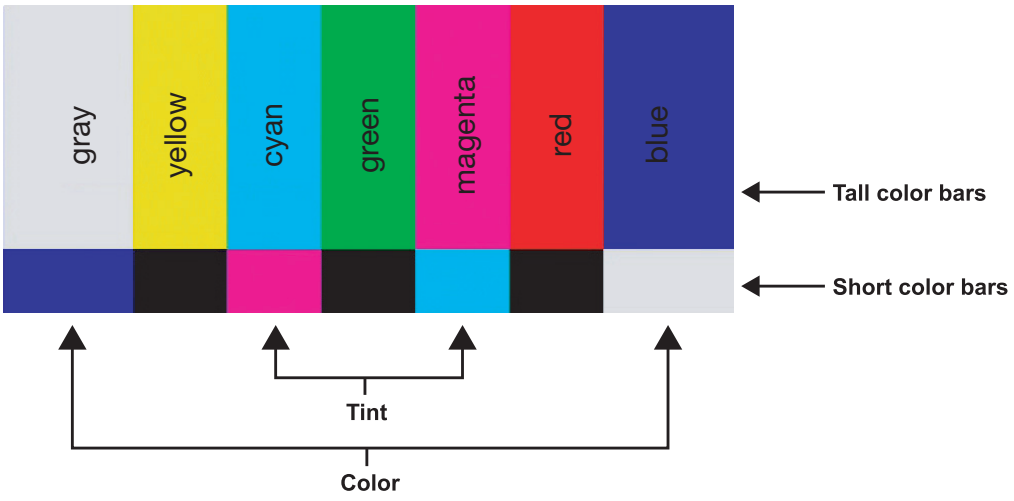
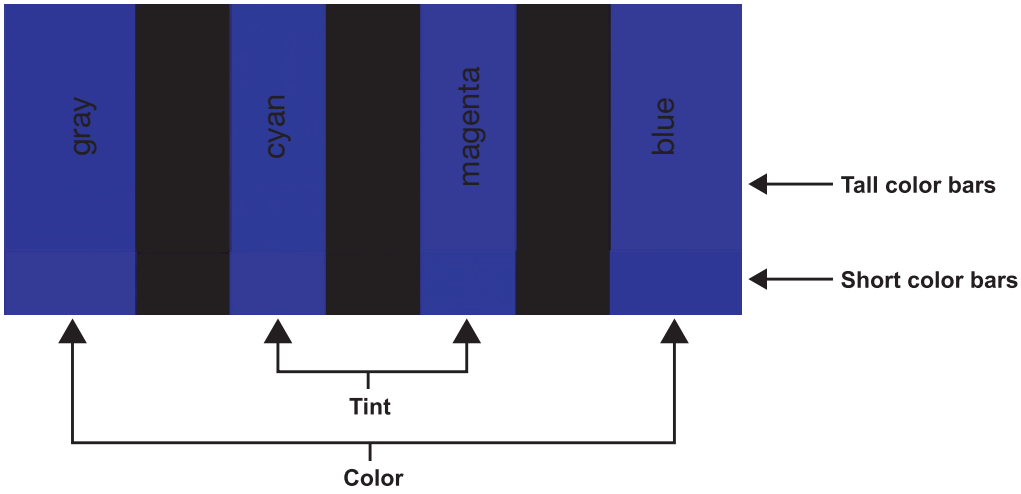


Figure 4-4. Typical Color Bar Pattern for Adjusting Color Saturation and Tint

Select Color from the Picture Adjust menu. While looking at the color bar pattern through a blue filter, adjust the color saturation level until the outermost (gray and blue) color bars appear to be a single shade of blue:



Tint: Tint or "hue" is essentially the ratio of red to green in the color portion of the image. When tint is decreased, the image appears redder; when it is increased the image appears greener. To set the tint, select Tint from the Picture Adjust menu. While looking at the color bar pattern through a blue filter, adjust the tint level until the cyan and magenta color bars (on either side of the green bar) appear to be a single shade of blue.

Note

Like the brightness and contrast controls, the color and tint controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Sharpness: “Sharpness” is the amount of high-frequency detail in the image. To adjust sharpness, select Sharpness from the Picture Adjust menu and press **ENTER**. On your external test pattern source, select a pattern like the one shown in Figure 4-5. Adjust as needed, looking for white edges around the transitions from black to gray and different sized lines in the “sweep” patterns at the top and bottom. Lower the sharpness setting to eliminate them.

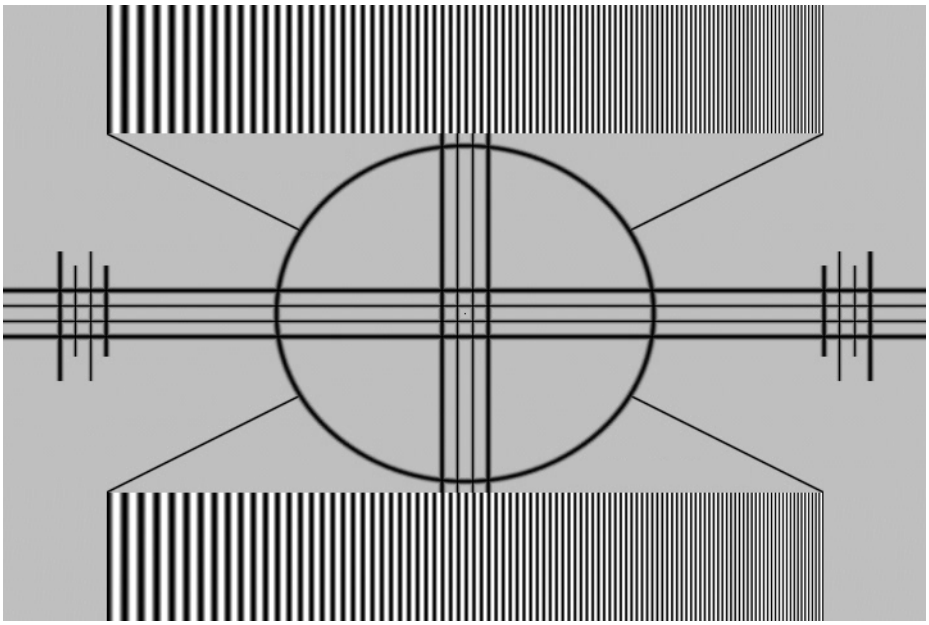


Figure 4-5. Typical Test Pattern for Adjusting Sharpness

DNR: To apply Digital Noise Reduction (DNR) to the input signal, select DNR from the Picture Adjust menu. Noise reduction is useful for clearing up noisy RGB images such as those from a PC. Adjust as desired using the left- or right-arrow buttons, keeping in mind that reducing noise (which reduces high frequencies) may also “soften” the image.

MPEG NR: Use the MPEG Filter to reduce or eliminate so-called “mosquito noise” in MPEG-compressed video signals (digital broadcasts or DVDs). Adjust as needed to minimize distortion around the edges of moving objects, moving artifacts around edges and/or blotchy noise patterns superimposed over the objects.

Backlight: The Backlight control changes the apparent brightness of the displayed image. Its effect is similar to that of a lamp intensity control on a projector.

Note

The Backlight control is disabled when Auto Backlight (described on page 41) is set to On.

Color Temperature: To adjust the color temperature, select Color Temp. from the Picture Adjust menu and press **ENTER**. (Color temperature defines the “color of gray.”) The choices are 5400K, 6500K, 8500K and Custom. The default setting, 6500K, is appropriate for most situations. Higher settings produce a “bluer” picture; lower ones impart a reddish hue to the image.

Gamma: The Gamma control determines how gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting helps to optimize blacks and whites while ensuring smooth transitions for the "in-between" values utilized in other grays.

Unlike brightness and contrast controls, Gamma allows you to lighten or darken the overall tone of your images without changing the extremes. All images will be more vibrant while still showing good detail in dark areas.

The default Gamma setting of 2.20 is appropriate for most typical home theater environments.

Save Settings: The Crystal Series LCD lets you save image quality settings for each input and supported resolution to a preset. You can recall this preset at a later time by simply pressing a button on the remote control or using the Restore Settings menu command (see below).

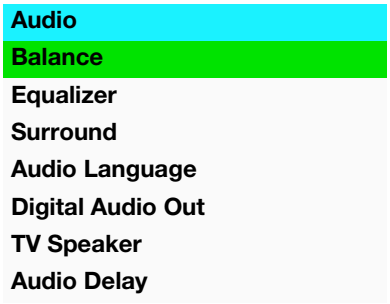
You should save changes to any of the following settings to a preset; otherwise they will be lost when a new input source or resolution is selected:

- Brightness
- Contrast
- Color saturation
- Tint
- Sharpness
- Gamma
- Color temperature and white balance

Restore Settings: To recall a preset, choose Restore Settings from the Picture Adjust menu and select "Custom," "ISF Day" or "ISF Night." Or, use the corresponding buttons on the remote control.

➤ *Audio*

To adjust the Crystal Series LCD audio settings, select Audio from the Main Menu and press **ENTER**.



Balance: To adjust the left/right speaker balance, select Balance from the Audio Menu and press **ENTER**. Use the left- and/or right-arrow buttons to make one channel louder than the other.

Equalizer: The Crystal Series LCD has a five-band graphic equalizer that you can use to boost or cut certain audio frequencies. To use it, select Equalizer from the Audio menu and press **ENTER**. Select one of four equalizer presets – Standard (flat), Music, Film or Speech – or select Custom to create your own according to taste. The five frequency bands are 100, 300, 1000, 3000 and 10,000 Hertz (Hz).

Surround: The Crystal Series LCD has a "surround sound" mode that simulates a multi-channel sound system. To use the surround mode, select Surround from the Audio menu and set it to On.

Note

When Surround is set to On, the graphic equalizer is disabled.

Audio Language: Some digital TV broadcasts provide audio soundtracks in multiple languages. If you are watching such a program, select Audio Language from the Audio menu to choose a soundtrack language: English, Français, Español or Português.

Digital Audio Out: The Crystal Series LCD can output either two or six channels of digital audio. Select **Dolby Digital** if your A/V receiver can decode a Dolby Digital-encoded, 5.1-channel bitstream. Otherwise, select **PCM** to have the Crystal Series LCD output PCM-encoded, stereo audio.

TV Speaker: To disable the speakers, select TV Speaker from the Audio menu, set it to Off and press **ENTER**. The effect is similar to using the **MUTE** button, except that the Crystal Series LCD "remembers" this setting if you turn off the display, then turn it back on.

Audio Delay: Use the Audio Delay control to correct audio/video synchronization issues with DTV broadcasts. Select from 0 to 40 milliseconds of delay, as needed.

Channel ➤

To set up the Crystal Series LCD channel tuner, select TV as the source. Then, select Channel from the Main Menu and press **ENTER**.

Auto Tuning: To have the Crystal Series LCD automatically detect available TV or CATV channels, select Auto Tuning and press **ENTER**. Then, select STD and press **ENTER** again.

The Crystal Series LCD searches all channel frequencies and adds a channel to its memory when it detects a signal on that channel frequency. (This may take a few minutes.) If Auto Tuning fails to detect any CATV channels, select HRC or IRC and try again. (STD, HRC and IRC refer to different sets of frequencies used by cable television providers. IRC stands for "Incrementally Related Carrier;" HRC stands for "Harmonically Related Carrier.")

Add/Erase: If Auto Tuning fails to detect a channel, select Add/Erase from the Channel menu and press ▲ or ▼ to select it. Then, select Add to add it to the channel list. To erase the currently-selected channel from the available channel list, select Add/Erase from the Channel menu, then select Erase.

Favorite Channel: You can specify up to five channels as "favorite" channels that can be accessed by pressing a single button on the remote, instead of manually entering the channel number. To do this, select Favorite Channel from the Channel menu and press **ENTER**.

Use the up- or down-arrow button to select the memory location in which you want to store the favorite channel. Then, use the left- or right-arrow button to specify the channel number.

To erase a favorite channel selection, press **ENTER**.

Press **EXIT** when you have finished programming favorite channels.

To recall a favorite channel, press the **FAV CHAN** button repeatedly on the remote control.

To set the Crystal Series LCD's internal clock or configure the on/off timers, select Timer from the Main Menu and press **ENTER**.

Time: To set the Crystal Series LCD internal clock, select Time from the Timer menu and press **ENTER**. Then, do either of the following:

- To synchronize the internal clock with time codes sent by the local Public Broadcasting Service (PBS) member station, select **Auto Setup**. The display must be connected to an off-air antenna or CATV system in order for this to work.
- To manually set the clock, use the up- or down-arrow button to select the hour of the day, AM/PM or the minute of the hour to set. Then, use the left- or right-arrow buttons to set that component of the time.

When finished, press **MENU** or **EXIT**.

On Timer: Use the On Timer to turn the Crystal Series LCD on at a specific time of day. You can also specify a channel and a volume level.

Off Timer: Use the Off Timer to turn the Crystal Series LCD off at a specific time of day.

Sleep Timer: Use the Sleep Timer to turn off the Crystal Series LCD after a specified interval.

To set the Sleep Timer:

- Select Sleep Timer from the Timer menu and press **ENTER**. Use the right- or left-arrow button to select 10, 30, 60, 120 or 180 minutes. Then, press **MENU**.

  – OR –

- Press the **TIMER OFF** button on the remote control repeatedly to select the desired timer interval.

Time Zone: To set the local (North American) time zone, select Time Zone from the Timer menu and press **ENTER**. Use the up- or down-arrow button to select Eastern, Central, Mountain, Pacific, Alaska or Hawaii. Press **ENTER** to confirm your selection.

Daylight Saving: If you are in a region that observes Daylight Saving Time (DST), select Daylight Saving from the Timer menu and set it to Automatic to have the Crystal Series LCD automatically adjust the time (one hour ahead on the first Sunday in April; one hour back on the last Sunday in October). The display must be connected to an off-air antenna or CATV system in order for this to work.

You can also manually adjust the time to reflect DST. Set Daylight Saving to On if DST is currently in effect. Set it to Off if DST is not currently in effect or not observed in your region at all.

◄ ***Timer***

Setup ➤

- **Setup**
- **OSD Language**
- **PC Mode Adjust**
- **Caption**
- **Parental Control**
- **Letterbox Mode**
- **Input Selection**
- **Monitor Out**
- **Overscan**
- **Input Label**
- **HDMI Audio**
- **RGB Signal**
- **Film Mode**
- **Auto Backlight**
- **OSD Timer**
- **Auto Off**

Use the controls in the Setup menu to perform advanced image quality adjustments and access various other Crystal Series LCD features.

OSD Language: Select OSD Language from the Setup menu and press **ENTER**. Then, use the up- or down-arrow buttons to select the OSD language (English, French, Spanish, Portuguese or German). Press **ENTER** again to confirm your selection.

PC Mode Adjust: To improve the quality of displayed images from a computer or other VESA-compliant, RGB (480p or higher) source, select PC Mode Adjust and press **ENTER**.

- **Auto Adjust:** Auto Adjust automatically adjusts settings to optimize computer images. To execute Auto Adjust on command, select Auto Adjust and press **ENTER**.

Note

Auto Adjust may take some time to complete, depending on the characteristics of the incoming signal.

- **Clock:** Use the up- or down-arrow buttons (▲, ▼) to highlight Clock. Then, use the right-arrow button (▶) to increase the pixel clock rate; use the left-arrow button (◀) to decrease it.
- **Phase:** Adjust the phase if the image shows shimmer or “horizontal noise.” Pixel phase adjusts the phase of the pixel sampling clock relative to the incoming signal. The effect of this control is similar to that of a tracking control on a VCR.

  For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar “half on, half off” graphic image. (You may notice that you can stabilize the image at more than one point. Use either setting in this case.)
- **H Position:** Use the up- or down-arrow buttons (▲, ▼) to highlight H Position. Then, use the right-arrow button (▶) to shift the image to the right; use the left-arrow button (◀) to shift the image to the left.
- **V Position:** Use the up- or down-arrow buttons (▲, ▼) to highlight V Position. Then, use the right-arrow button (▶) to shift the image up; use the left-arrow button (◀) to shift the image down.

To restore the factory-default Clock, Phase and Position settings, select Factory Preset and press **ENTER**.

Caption: Select Caption from the Setup menu to control the display of closed captions when watching programs that contain them.

- **Display:** Select On or Off to control the display of closed captions.
- **Digital Mode:** For digital TV broadcasts, select one of six captioning modes (Service1, Service2 ... Service6). Service1 usually contains the native-language captions; if a program is captioned in more than one language, those captions are carried on Service2 through Service6.
- **Analog Mode:** Select one of four captioning modes: CC1, CC2, CC3 or CC4. CC1 usually contains the native-language captions; if a program is captioned in more than one language, those captions are carried on CC2, CC3 or CC4.

  The Crystal Series LCD also supports “text mode” captioning; to use this feature, select Text1, Text2, Text3 or Text4. The text modes, instead of displaying a few lines of captions somewhere on the picture, take over all or half of the screen to display scrolling text information. (The text modes are seldom used today, so most of the time there is no information there to see.) The text field is sometimes used for embedding

Internet data (called Interactive TV Links, or ITV Links) in the captions.

- **CC On Mute:** To have the Crystal Series LCD show captions when the audio output is muted, set this option to Yes.
- **Digital Font Option:** Select Digital Font Option from the Caption menu to customize the appearance of closed captions in digital TV broadcasts.
  - **Control:** Select Program to view the closed captions as presented by the broadcaster. Or, select User to override the program's closed caption formatting.
  - **Font Size/Font Style:** These settings alter the size and typeface of closed captions.
  - **FG Color/BG Color/Edge Color:** These settings alter the text color, background color and text border color respectively.
  - **FG Opacity/BG Opacity:** These settings alter the degree to which the program "shows through" the captions.
  - **Edge Style:** This setting alters the text border style.

Parental Control: To block the display of television programs or movies based on their ratings, select Parental Control from the Setup menu and press **ENTER**. Enter the default Personal Identification Number (PIN) – **0000** – and press **ENTER** again.

- **Parental Lock:** This is the "master switch" for the parental controls. Set it to On on Off.
- **TV Rating:** Select TV Rating from the Parental Control menu to block television programs carrying a given rating, to prevent children from watching programs that are deemed inappropriate. These ratings and content labels have been established by the United States Federal Communications Commission (FCC) to help parents and other caregivers determine if a program is suitable for young viewers.

  To block programs carrying a given rating, use the up- or down-arrow to select a rating. Then, press the right-arrow button to require the PIN code to be entered to view a program with that rating. A lock icon ( ) appears to indicate that the restriction is active.

  Table 4-2 describes the TV ratings and content categories. For more information, visit http://www.fcc.gov/parents/parent_guide.html.

Table 4-2. FCC Ratings and Content Categories

Rating/Category	Description
TV-MA	Mature Audience Only - graphic violence, explicit sexual content and/or offensive language
TV-14	Parents strongly cautioned - intense violence, sexual situations, coarse language and/or suggestive dialogue
TV-PG	Parental guidance suggested - violence, sexual situations, coarse language and/or suggestive dialogue
TV-G	General audience – suitable for children and adults
TV-Y7	Children 7 and up
TV-Y	Suitable for all children
FV	Fantasy violence or cartoon violence
D	Sexual dialogue
L	Offensive language

Table 4-2. FCC Ratings and Content Categories (continued)

Rating/Category	Description
S	Sexual content
V	Violence

- **Movie Rating:** Select Movie Rating from the Parental Control menu to block movies carrying a given rating, to prevent children from watching movies that are deemed inappropriate. These ratings have been established by the Motion Picture Association of America (MPAA) to help parents and other caregivers determine if a movie is suitable for young viewers.

  To block movies carrying a given rating, press the right-arrow button to require the PIN code to be entered to view a movie with that rating. A lock icon ( ) appears to indicate that the restriction is active.

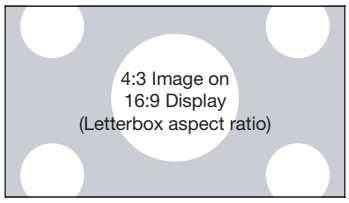
  For more information on movie ratings, please visit http://www.mpaa.org/movieratings/.
- **Unrated:** To allow or block access to unrated content, select Unrated from the Parental Control menu and select Allow or Block. Press **ENTER** to confirm your choice.
- **Change PIN:** The default PIN for accessing the parental controls or bypassing content restrictions is **0000**. Runco recommends changing this to something less obvious.

Letterbox Mode: Select Letterbox Mode from the Setup menu to change the zoom factor that takes effect when you select the Letterbox aspect ratio (refer to Table 4-1).

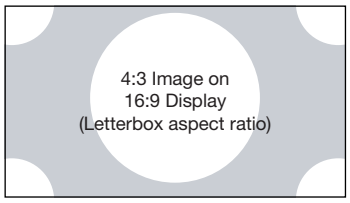
When you select Letterbox, the image is enlarged (zoomed in) by a factor of approximately 1.33.

When you select Cinema Fill, the zoom factor is approximately 1.77 (1.33 x 1.33).

Letterbox Mode = Letterbox



Letterbox Mode = Cinema Fill



Input Selection: Input 1 and Input 2 have both S-Video and Composite video connectors. Input 3 and Input 4 have both Component and Composite video connectors. To specify which connection type you are using – or to switch from one to the other if equipment is connected to both – select Input Selection from the Setup menu and press **ENTER**.

The default setting for all four AV inputs is **Automatic**. With this setting, the Crystal Series LCD searches for an active source on both connectors and displays the first one it detects. If equipment is connected to both, Automatic input selection triggers a switch when a source component is disconnected or powered off.

Monitor Out: If you have equipment connected to the AV OUT, select Monitor Out from the Setup menu to route either the main or PIP audio/video signals to that output.

Overscan (not available with PC signals): Overscan pushes the outside edge of the active picture area of the video signal out beyond the edge of the display area.

Some television programs are produced based on the assumption that older television sets may not display the outer edges of the broadcast picture area. Overscan effectively trims away these inactive, outer edges and enlarges the remaining portion of the image to fill the display area.

Use the on-screen slidebars to set the desired amount of horizontal and vertical overscan, as well as horizontal and vertical image shift.

These settings only affect 480i source material. For HDTV, DVDs and other video sources, Overscan is generally not necessary or desirable.

Input Label: You can give each Crystal Series LCD input a descriptive name. To do this, select Input Label from the Setup menu and choose one from the list.

HDMI Audio: If the HDMI source is a PC or other device that does not support audio output via HDMI, set HDMI Audio to PC.

If the source does support audio output via HDMI, set this option to HDMI to route the HDMI (digital) audio signal to the speakers when HDMI1 or HDMI2 is selected.

RGB Signal: The RGB input supports both DTV and VESA (computer) resolutions and signal timings. If the RGB source is a computer, select PC. If it is a DTV set-top box or other equipment with an RGB output, select Video.

Film Mode: To smooth out moving images from interlaced, standard-definition (SD) sources, select Film Mode and set it to Automatic.

In most cases, the Crystal Series LCD detects the proper “pull-down” rate and vertical frequency. However, if your source is jittery and/or tearing you may wish to specify the pull-down rate (2:2 or 3:2) to ensure stable processing for that source.

Auto Backlight: Select Auto Backlight from the Setup menu and set it to On to have the Crystal Series LCD adjust the Backlight setting automatically, according to the ambient light level in the viewing area.

OSD Timer: Use the ◀ or ▶ button to set the OSD Timer. This timer controls how long the menus remain on-screen after selecting them. Select from 0 to 60 seconds, in 10-second increments. When you set the OSD to 0, the menus remain on-screen until you hide them by pressing **EXIT**.

Auto Off: Set **Auto Off** to 30, 60 or 120 minutes to have the Crystal Series LCD go into standby mode when no source signal is present for the selected amount of time.

When **Auto Off** is set to zero (0) minutes (disabled), the Crystal Series LCD remains in normal operating mode, regardless of the presence or absence of an input sync signal.

ISF Calibration ➤

ISF Calibration
Picture Adjust
White Balance
Blue Enable
Baud Rate
Factory Reset
Splash Duration

Use the ISF Calibration menu to perform advanced picture quality adjustments. **This menu should be used by ISF-certified technicians only.**

Note *You must enter a passcode to access the ISF Calibration menu.*

Picture Adjust: The controls in this menu are identical to those in the main Picture Adjust menu, but are accessible only by entering the ISF Calibration menu passcode. This makes it possible to restore the picture quality settings to what they were when the Crystal Series LCD was installed, simply by recalling the “ISF Night” or “ISF Day” preset.

- **Brightness:** Refer to ***Brightness*** on page 31.
- **Contrast:** Refer to ***Contrast*** on page 32.
- **Color:** Refer to ***Color Saturation*** on page 33.
- **Tint:** Refer to ***Tint*** on page 33.
- **Sharpness:** Refer to ***Sharpness*** on page 34.
- **ADC Phase Adj.:** This control works similarly to the Phase adjustment for RGB signals (refer to ***Phase*** on page 38). Use it to improve the apparent sharpness of 720p and lower-resolution Component, S-Video or Composite sources. For best results, adjust ADC Phase while displaying a “Sharpness” pattern (Figure 4-5).
- **DNR:** Refer to ***DNR*** on page 34.
- **MPEG NR:** Refer to ***MPEG NR*** on page 34.
- **Backlight:** Refer to ***Backlight*** on page 34.
- **Color Temp.:** Refer to ***Color Temperature*** on page 34.

Tip *If you are adjusting a “Custom” color temperature, select Custom from the Color Temp. menu and press **ENTER**. Then, press **ENTER** a second time to go directly to the White Balance menu. (This shortcut is available only from the ISF Calibration menu.)*

- **Gamma:** Refer to ***Gamma*** on page 35.
- **Black Level:** This control compensates for incoming elevated black levels present in certain video signals. The default setting (32) results in a minimum black level of approximately 0 IRE. Adjust as needed to match the dynamic range of the source; increase the value if blacks appear elevated (dark gray). If blacks appear “crushed” (too dark), use a lower settting.

- **Save Settings:** For each input and supported resolution, the Crystal Series LCD lets you save image quality settings as presets that you can recall at a later time. You can create up to three presets – designated “Custom,” “ISF Day” and “ISF Night” – per input and resolution.

  You should save changes to any of the following settings to a preset; otherwise they will be lost when a new input source or resolution is selected:

  - Brightness
  - Contrast
  - Color saturation
  - Tint
  - Sharpness
  - Gamma
  - Color temperature and white balance

  To save image settings to a preset, select Save Settings from the ISF Calibration menu and select “Custom,“ “ISF Day” or “ISF Night.”

White Balance: To remove any trace of color from the white areas of the projected image, choose White Balance from the Picture Adjust menu and press **ENTER**.

White Balance	
R Gain	100
G Gain	100
B Gain	100
R Offset	50
G Offset	50
B Offset	50

- **Gain:** Use the Gain controls to correct color imbalances in the bright areas of the image. A good way to do this is to use a test pattern consisting mostly of solid white areas, such as an 80 IRE “window” pattern. If the white areas contain traces of red, green or blue, decrease the Gain for that color.
- **Offset:** Use the Offset controls in the White Balance sub-menu to correct color imbalances in the dark areas of the image. A good way to do this is to use a test pattern consisting mostly of dark gray areas, such as a 30 IRE “window” pattern. If the gray areas contain traces of red, green or blue, decrease the Offset for that color.

Note

Any white balance adjustments you make here are automatically stored as a “Custom” color temperature.

Blue Enable: Blue Enable removes all red and green color information from the image, simulating a blue filter. You can use it instead of a blue filter when performing color and tint adjustments.

Baud Rate: Select Baud Rate from the ISF Calibration menu to set the data transfer rate of the Crystal Series LCD’s RS-232 SERVICE port. (This setting must match the data rate of the device connected to the RS-232 input.)

Serial Link: Select Serial Link from the ISF Calibration menu to configure the RS-232 Service port (see Figure 3-11) for normal operation (On) or for software upgrades (Off).

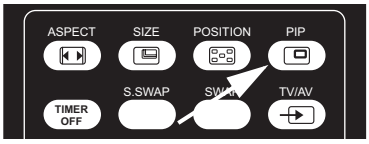
Factory Reset: To reset all Crystal Series LCD settings to their factory defaults, select Factory Reset from the ISF Calibration menu and press **ENTER**. ***This command is not undoable. Use it with caution!***

Splash Duration: Use Splash Duration to control how long the Crystal Series LCD splash screen remains on-screen after power-up; see Figure 4-6. To prevent this screen from appearing, set the Splash Duration to 0.

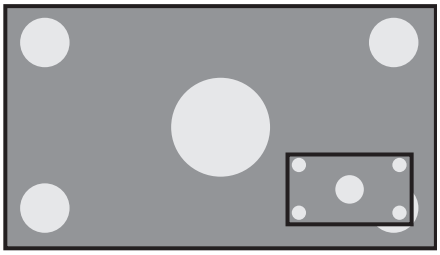
Figure 4-6. Crystal Series LCD Splash Screen

4.5 Using Picture-In-Picture (PIP)

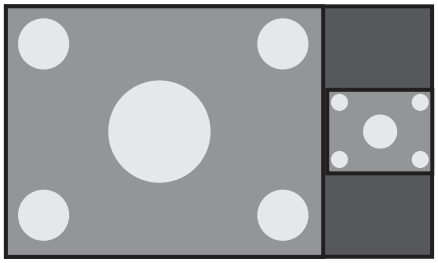
To use PIP, press the **PIP** (⧉) button.



The PIP window appears inside the main image window.



Press **PIP** again to switch to side-by-side PIP mode.



Press **PIP** again to turn PIP off.

Press the **TV/AV** button ( ) to select a PIP signal source. For each source, Table 4-3 shows which of the other sources are available as a PIP source.

Table 4-3. Available Main and PIP Source Combinations

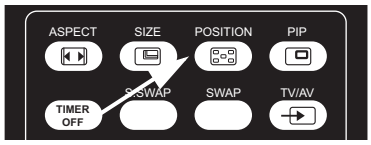
			PIP Input Source									
			TV	INPUT 1	INPUT 2	INPUT3		INPUT4		RGB	HDMI 1	HDMI 2
						VIDEO	COMP	VIDEO	COMP			
Main Input Source	TV		–	√	√	√	√	√	√	√	√	√
	INPUT1		√	–	√	√	√	√	√	√	√	√
	INPUT2		√	√	–	√	√	√	√	√	√	√
	INPUT3	VIDEO	√	√	√	–	–	√	√	√	√	√
		COMP.	√	√	√	–	–	√	√	√	√	√
	INPUT4	VIDEO	√	√	√	√	√	–	–	√	√	√
		COMP.	√	√	√	√	√	–	–	√	√	√
	RGB		√	√	√	√	√	√	√	–	–	–
	HDMI1		√	√	√	√	√	√	√	–	–	–
	HDMI2		√	√	√	√	√	√	√	–	–	–

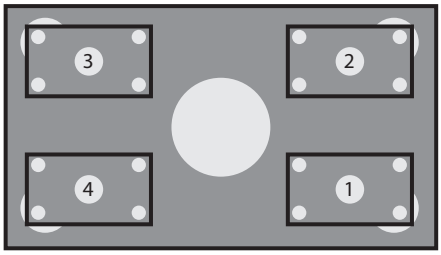
Notes:

1. *"√" means that that source is available as a PIP source when that input is selected; "–" means that it is not.*
2. *The Crystal Series LCD cannot display the same source in both the main and PIP windows, nor can it display RGB and HDMI (digital) signals simultaneously.*

◄ *Changing the PIP Position*

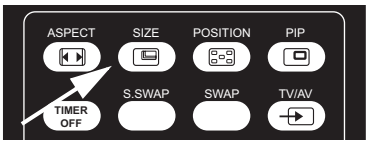
To change the PIP window position, press the **POSITION** ( ) button on the remote control repeatedly until the window is in the desired position.

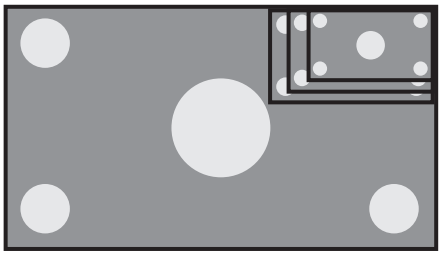




◄ *Changing the PIP Size*

To change the PIP window size, press the **SIZE** ( ) button on the remote control repeatedly to achieve the desired window size.

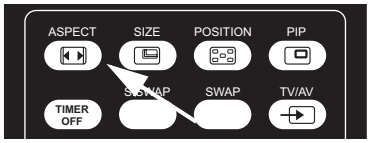




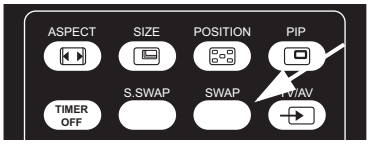
◄ *Changing the PIP Aspect Ratio*

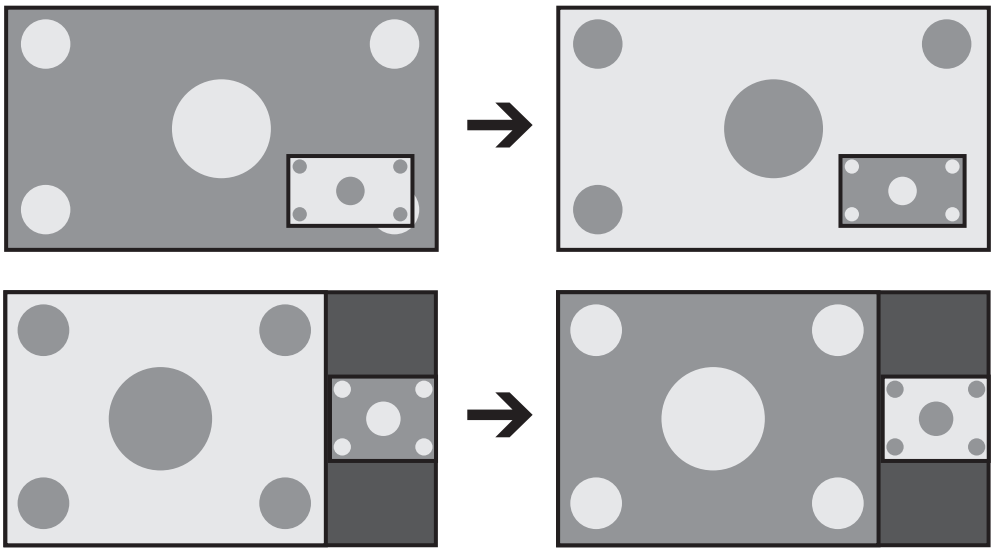
To change the aspect ratio of the PIP window from 4:3 to 16:9 or vice versa, press the **ASPECT** ( ) button on the remote control.

Refer to Table 4-1 for more information about aspect ratios.

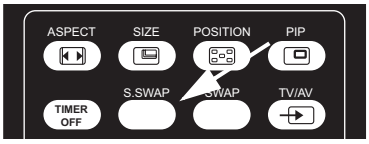


Swapping the Main and PIP Images ➤ To swap the main and PIP images, press the **SWAP** button on the remote control.





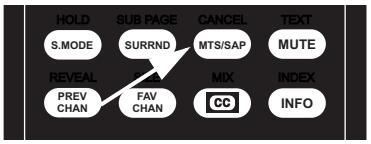
Swapping the Main and PIP Audio Programs ➤ To swap the main and PIP audio programs, press the **S.SWAP** button on the remote control.



4.6 Stereo Sound/SAP

The Crystal Series LCD supports Multichannel Television Sound (MTS), the broadcast audio standard that allows transmission of both stereo and Secondary Audio Program (SAP) content.

The SAP is usually a foreign-language translation. However, it can also be used for other purposes such as Described Video Services (DVS), which provide descriptive narration of key visual elements in programs for the benefit of the visually impaired.



You can select sound options (Mono, Stereo, SAP or Mono+SAP) depending on the broadcast signal by pressing the **MTS/SAP** button on the remote control.

- Choose Stereo for channels that are broadcasting in stereo.
- Choose Mono for channels that are broadcasting in mono, or if you are having difficulty receiving a stereo signal.
- Choose SAP to listen to the Secondary Audio Program.
- Choose **Mono+SAP** to listen to both the primary and secondary audio programs (for example, when a program has a DVS audio track).

Table 4-4 summarizes the audio broadcast modes supported by the Crystal Series LCD.

Table 4-4. Compatibility with Stereo and SAP Audio Broadcasts

Broadcast Mode	Receive Mode			
	Mono	**Stereo**	**SAP**	**Mono+SAP**
Mono	Mono	Mono	Mono	Mono
Stereo	Mono	Stereo	Mono	Stereo
Mono+SAP	Mono	Mono	SAP	Mono+SAP
Stereo+SAP	Mono	Stereo	SAP	Mono+SAP

Notes:

5. Maintenance and Troubleshooting

5.1 Cleaning

Regular cleaning will extend the life and performance of the Crystal Series LCD. Before cleaning, be sure to unplug the power cord from the power outlet.

◄ *Cleaning the Display Panel Body and Remote Control*

Do not under any circumstances use solvents such as benzene or thinner to clean the Crystal Series LCD. Doing so may cause deterioration or peeling of paint from the display or remote control unit.

Wipe the display and remote control gently with a soft cloth. In case of excessive dirt buildup, dampen a soft cloth with a diluted neutral cleaning detergent. Wring the cloth thoroughly, then wipe the component and dry it with a dry soft cloth.

◄ *Cleaning the Screen*

After dusting, wipe the screen gently using a soft cloth (cotton, flannel etc.). Do not use tissue or coarse fabric. The screen surface is easily scratched; do not rub it or hit it with a hard object.

If you clean the surface of the screen with a wet cloth, do not allow water droplets on the surface to enter into the product; this may cause a malfunction.

◄ *Cleaning the Vents*

As a general rule, use a vacuum cleaner about once a month to clean the vents on the rear panel of the display of dust buildup (set the vacuum cleaner to its weakest setting when doing this). If not removed, accumulated dust can cause the internal temperature to increase, resulting in possible breakdown or fire.

5.2 Troubleshooting Tips

Table 5-1 provides some general guidelines for troubleshooting problems you may encounter with the Crystal Series LCD. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact your Runco dealer or Runco Technical Support.

Table 5-1. Troubleshooting Chart

Symptom	Possible Cause(s)	Solution
The display does not turn on after initial installation.	• The Crystal Series LCD is not plugged in or the AC outlet is not active. • The remote control batteries have run out.	• Ensure that the Crystal Series LCD is plugged in and that the AC outlet is active. • Replace the batteries.
The display is on, but there is no picture.	• Incorrect source selection. • Source component is not turned on. • Source component is connected incorrectly or not at all.	• Select the correct source. • Turn on the source component. • Check video connections to source component.

Table 5-1. Troubleshooting Chart (continued)

Symptom	Possible Cause(s)	Solution
Picture is okay, but there is no sound.	• Audio output is muted. • Volume setting is too low. • Source component is connected incorrectly or not at all. • Speakers are connected incorrectly or not at all. • Audio settings are incorrect.	• Press the **MUTE** button on the remote control. • Turn up the volume. • Check audio connections to source component. • Check speaker connections (Figure 3-8). • Check the following settings: Digital Audio Out (page 36), TV Speaker (page 36) and HDMI Audio (page 41).
Image is too bright and/or lacks definition in the bright areas of the image.	• Contrast is set too high.	• Lower the contrast setting.
Image appears “washed out” and/or dark areas appear too bright.	• Brightness is set too high.	• Lower the brightness setting.
Black or white dots appear on all channels or a specific channel.	• Antenna or cable TV source is connected incorrectly or not at all. • Broadcast signal is weak.	• Check the antenna or cable TV connection. • If using an off-air antenna, adjust its position or location.
Colors in the image are swapped; for example, reds appear blue or vice versa.	• The Red/Pr, Green/Y or Blue/Pb outputs from the source are connected to the wrong inputs on the Crystal Series LCD.	• Ensure that the source outputs are connected to the correct Crystal Series LCD input.
RGB-HD images appear “noisy.”	• Clock and Phase settings need adjustment.	• Manually adjust Clock and Phase settings, or perform an Auto-Adjust (refer to ***PC Mode Adjust*** on page 38).
“Out of range” appears on-screen.	• The resolution and frequency of the video card in the computer are not compatible with the Crystal Series LCD.	• Select a compatible resolution and vertical frequency (refer to ***Computer Signal Compatibility*** on page 63).
The image is too large or too small.	• Image size needs adjusting.	• Adjust the image size (refer to ***PC Mode Adjust*** on page 38).
Poor broadcast sound quality.	• The sound quality of a stereo broadcast may be unstable in an area with a weak signal.	• Use the **MTS/SAP** button on the remote control to select mono.

6. Serial Communications

6.1 RS-232 Connection and Port Configuration

To interface the Crystal Series LCD with a home theater automation/control system or a PC running terminal emulation software, connect it to your control system or PC as shown in Figure 3-11. (Use a straight-through cable.)

Configure the RS-232 controller or PC serial port as follows: no parity, 8 data bits, 1 stop bit and no flow control. Set the baud rate to match that of the Crystal Series LCD RS-232 port. To check the baud rate setting, select Baud Rate from the ISF Calibration menu.

6.2 Serial Command Syntax

- Commands are in ASCII format and are not case-sensitive.
- A carriage return is not required after a command.
- When you send a valid command, the Crystal Series LCD executes it and acknowledges it with a right-bracket character (`]`) followed by the four-digit numeric code you sent; for example, `]0002`.
- When you send an invalid command (one followed by values outside the valid range for that command), the Crystal Series LCD ignores it and returns `>MAX` or `<MIN` instead of the four-digit code.
- When you send an unrecognized/misspelled command, the Crystal Series LCD ignores it and returns `-N/A` instead of the four-digit code.

Table 6-1 lists the RS-232 command set.

Table 6-1. Serial Commands

Command			Description
[	S3A	0###	Set audio volume to ### (= 000-100)
Example: [S3A0075 sets volume to 75			
[	+3A		Audio volume up
[	-3A		Audio volume down
[	S3E	000#	Audio mute (speakers/headphones) 0 = not muted, 1 = muted
Example: [S3E0001 mutes the audio output			
[	S4A	000#	Main input selection 0 = TV 1 = Input1 2 = Input2 3 = Input3 4 = Input4 6 = RGB 8 = HDMI1 9 = HDMI2
Example: [S4A0006 selects RGB			

Table 6-1. Serial Commands (continued)

Command			Description
[	+4A		Select “next” Main AV input
[	S4E	000#	Aspect ratio selection 0 = 4:3 (Standard) 1 = VirtualWide 2 = Letterbox 3 = 16:9 (Anamorphic)
Example: [S4E0002 selects Letterbox			
[	S4G	000#	PIP Input selection 0 = TV 1 = Input1 2 = Input2 3 = Input3 4 = Input4 6 = RGB 8 = HDMI1 9 = HDMI2
Example: [S4G0003 selects PIP Input3			
[	+4G		Select “next” PIP AV input
[	SAB	000#	Power on/off control 0 = standby, 1 = on
Example: [SAB0001 turns unit on			
[	SCA	000#	Caption on/off 0 = off 1 = on
Example: [SCA0000 turns caption off			
[	SCB	00##	Set major channel (AIR); ## = 01 - 99
Example: [SCB0002 selects off-air channel 2			
[	SCB	1###	Set major channel (CABLE); ### = 001 - 125
Example: [SCB1102 selects cable channel 102			
[	SCD	####	Set minor channel; #### = 0000 - 9999 *(Note: You must send a “Set major channel” command first.)*
Example: [SCD0001 selects minor channel 1			
[	+CB		TV channel up
[	-CB		TV channel down
[	SDA	000#	Set PIP mode 0 = OFF 1 = PIP 2 = PBP
Example: [SDA0002 selects PBP			

Table 6-1. Serial Commands (continued)

Command			Description
[	SDB	000#	Set PIP size 0 = small 1 = medium 2 = large
Example: [SDB0001 selects medium PIP size			
[	SDE	000#	Set PIP aspect ratio 0 = 4:3 1 = 16:9
Example: [SDE0001 selects 16:9 aspect ratio PIP window			
[	SDF	000#	Set PIP window position 0 = Top/Left 1 = Top/Right 2 = Bottom/Left 3 = Bottom/Right
Example: [SDF0001 positions PIP window in upper-right corner of display area			
The following serial commands are meant to emulate buttons on the remote control. Each button has its own serial command, so effectively it is as if you were using the IR remote only you'll be doing so via serial commands. These commands provide active OSD responses just like the IR remote. Each command begins with [key followed by the four-digit number of the button. No carriage return is necessary. The response you receive from the unit if the command is valid will be a right-bracket (]) followed by the four-digit numeric code you sent. (For example, the 'ON' command is [key0015; the response will be]0015). All commands are in ASCII.			
[	key	0002	OFF
		0015	ON
[	key	0004	Number 1
		0005	Number 2
		0006	Number 3
		0008	Number 4
		0009	Number 5
		0010	Number 6
		0012	Number 7
		0013	Number 8
		0014	Number 9
		0035	Number "–"
		0017	Number 0
		0023	TV

Table 6-1. Serial Commands (continued)

Command			Description
[	key	0105	INPUT1
		0027	INPUT2
		0028	INPUT3
		0001	INPUT4
		0102	HDMI1
		0101	HDMI2
		0019	RGB HD
[	key	0003	CUSTOM
		0062	ISF NIGHT
		0031	ISF DAY
[	key	0040	16:9 (ANA)
		0043	4:3
		0039	LETTERBOX
		0126	VIRTUALWIDE
[	key	0007	Right-Arrow key
		0016	Down-Arrow key
		0018	Up-Arrow key
		0011	Left-Arrow key
		0046	ENTER
[	key	0026	MENU
[	key	0100	EXIT
[	key	0063	PIP ASPECT RATIO
		0047	PIP SIZE
		0034	PIP POSITION
		0032	PIP
		0037	TIMER OFF
		0052	S.SWAP
		0033	SWAP
		0036	TV/AV
[	key	0053	S.MODE

Table 6-1. Serial Commands (continued)

Command			Description
		0054	SURROUND
		0024	MTS/SAP
		0091	MUTE
[	key	0057	PREVIOUS CHANNEL
		0045	FAVORITE CHANNEL
		0044	CLOSED CAPTION (on/off)
		0055	INFO

Notes:

7. Specifications

7.1 Crystal Series LCD Specifications

Table 7-1 lists the Crystal Series LCD specifications.

Table 7-1. Crystal Series LCD Specifications

Native Resolution:	1920 x 1080
Screen Size:	**CX-40HD =** 40 in. (diagonal) **CX-46HD =** 46 in. (diagonal)
Screen Aspect Ratio:	16:9
Available Aspect Ratios:	4:3, Letterbox, 16:9 (Anamorphic), VirtualWide™
DTV Compatibility:	480i/p, 576i/p, 720p, 1080i, 1080p
ISF Settings:	Yes
Contrast Ratio:	1000:1
Data/Graphics Compatibility:	Refer to Table 7-2
Vivix Processing:	3:2 or 2:2 pull down
Inputs:	Multiple input combinations with up to (4) Composite Video (2) S-Video (2) Component Video (2) HDMI w/HDCP (1) RGB (15-pin D-sub) (1) RS-232 Control (5) Analog Audio (4 stereo RCA pairs + 3.5-mm stereo mini jack) (1) RF Antenna (1) CATV (75-ohm coaxial)
Outputs:	(1) Composite Video (1) Analog Audio (stereo RCA pair) (1) Stereo headphone (3.5-mm stereo mini jack) (1) Digital Audio (S/PDIF, RCA coaxial) (1) Digital Audio (TosLink optical)
Audio System:	10W RMS x 2, L/R two-way Detachable Speaker System
Tuner:	NTSC/ATSC Stereo (PAL as monitor only), HDTV, PIP/PBP, Parental Control (V-Chip), Closed Caption
Discrete IR Control:	Source, power and aspect ratios
Power Requirements:	100 to 240 VAC, 50/60Hz
Power Consumption:	**CX-40HD =** 270W **CX-46HD =** 310W
Operating Environment:	40ºF to 95ºF (5ºC to 35ºC); 20% to 80% humidity (non-condensing)
Dimensions:	**CX-40HD =** see Figure 7-1 **CX-46HD =** see Figure 7-2

Table 7-1. Crystal Series LCD Specifications (continued)

Weight:	**CX-40HD =** 63.93 lbs. (29.0 kg) **CX-46HD =** 76.28 lbs. (34.6 kg)
Regulatory Approvals:	Complies with FCC, UL
Limited Warranty:	One (1) year parts and labor from the date of delivery to the end user.

Specifications are subject to change without notice.

7.2 Crystal Series LCD Dimensions

Figure 7-1 and Figure 7-2 show the Crystal Series LCD dimensions (all dimensions are in inches).

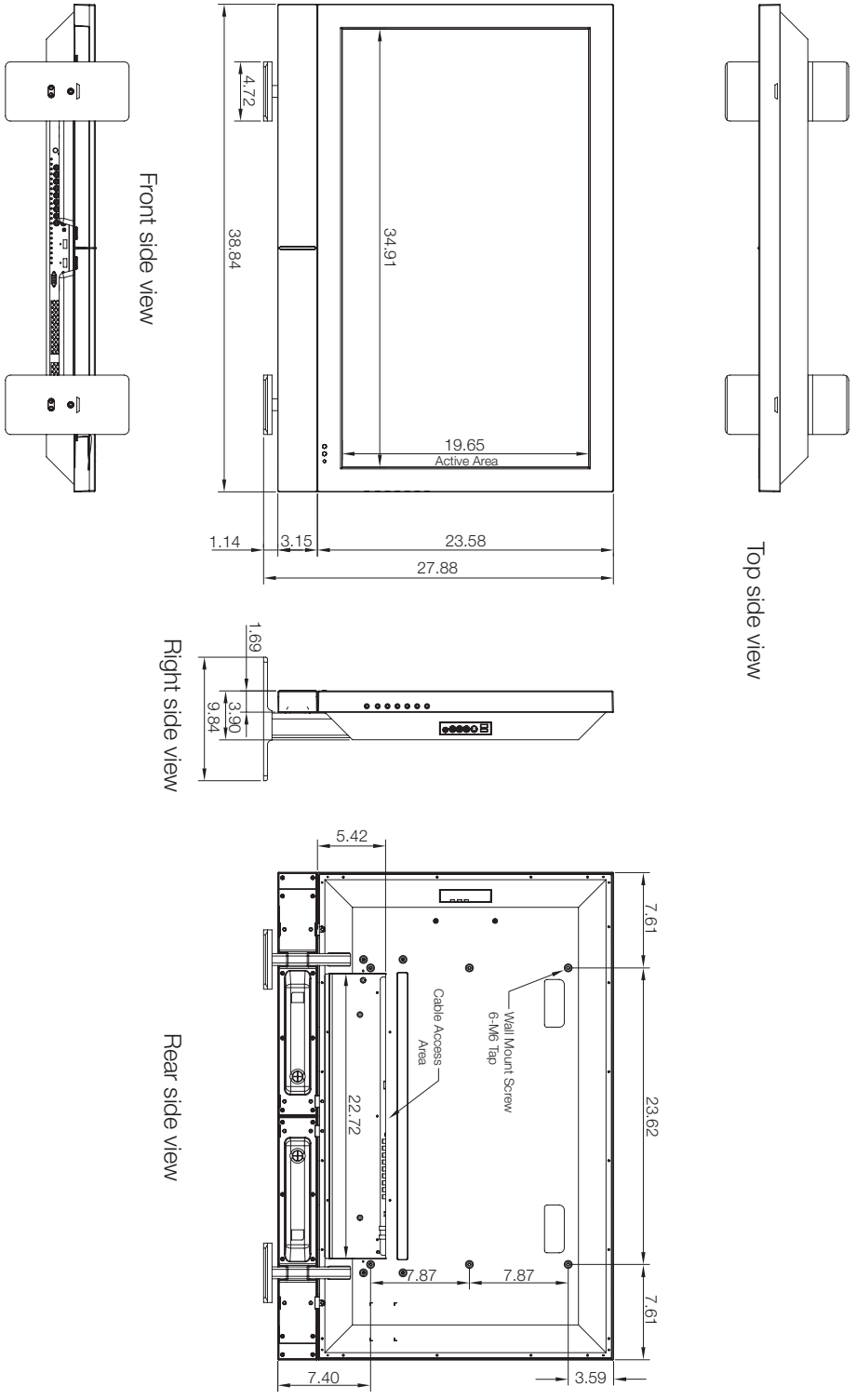


Figure 7-1. CX-40HD Dimensions

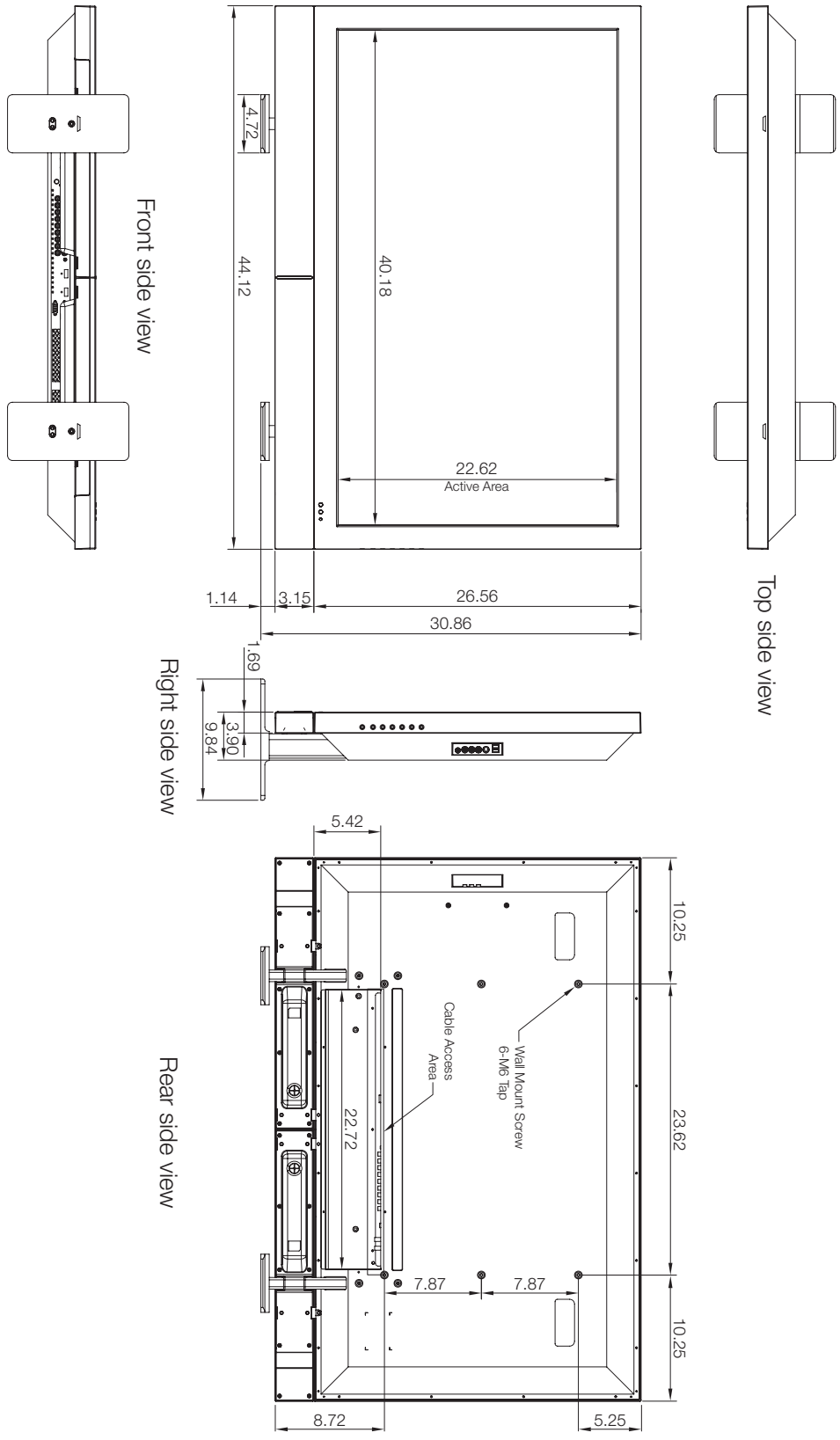


Figure 7-2. CX-46HD Dimensions

7.3 Computer Signal Compatibility

The Crystal Series LCD can display video signals from a variety of computer sources via its RGB-HD and HDMI inputs.

Table 7-2 lists the signal types that are compatible with the Crystal Series LCD, and indicates which of those are VESA standards.

Table 7-2. Computer/Video Signal Compatibility Chart

Signal Type	Mode		Vertical Frequency (Hz)	Horizontal Frequency (kHz)	RGB	HDMI
VESA	640x350	85	85.00	31.28	√	–
VESA	640x400	85	85.00	35.78	√	–
VESA	640x480	60	60.00	29.82	√	√
MAC	640x480	67	66.70	35.00	√	√
MAC	640x480	72	72.80	37.90	√	√
MAC	640x480	75	75.00	37.50	√	√
VESA	800x600	56	56.00	35.20	√	√
VESA	800x600	60	60.30	37.90	√	√
VESA	800x600	72	72.20	48.70	√	√
VESA	800x600	75	75.00	46.90	√	√
VESA	1024x768	60	60.00	48.40	√	√
VESA	1024x768	70	70.10	56.50	√	√
VESA	1024x768	75	75.00	60.00	√	√
VESA	1280x768	60	60.00	47.70	√	–
VESA	1280x1024	75	75.00	80.17	√	√
VESA	1600x1200	60	60.00	74.52	√	√
VESA	1920x1080	60	60.00	67.50	√	√

Note: *The Crystal Series LCD may not be able to display images from notebook computers in simultaneous (CRT/LCD) mode. Should this occur, switch the notebook computer to "CRT only" mode. If you are unsure how to do this, refer to your notebook computer's user manual.*

Notes:

SERIAL NUMBER

RUMA-009805
rev 07-03-07 v1.4

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